OECD Pensions Outlook 2014

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BETTER POLICIES FOR BETTER LIVES

Please cite this publication as:
OECD (2014), *OECD Pensions Outlook 2014*, OECD Publishing.
http://dx.doi.org/10.1787/9789264222687-en

ISBN 978-92-64-22090-4 (print)
ISBN 978-92-64-22268-7 (PDF)

Series:
ISSN 2313-7630 (print)
ISSN 2313-7649 (online)

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Foreword

This second edition of the OECD Pensions Outlook *provides an analysis of different pension policy issues in OECD countries covering both public and private pension systems.*

This report is the joint work of staff of the Financial Affairs Division of the OECD Directorate for Financial and Enterprise Affairs and the Social Policy Division of the OECD Directorate for Employment, Labour and Social Affairs. It has benefited from contributions from national government delegates, particularly delegates to the Committee for Financial Markets, Insurance and Private Pensions Committee, the Working Party on Private Pensions and the Working Party on Social Policy. The views expressed here do not necessarily correspond to those of the national authorities concerned.

The editorial team for this report was led by Pablo Antolín. Chapter 1 was prepared by Pablo Antolín and Jessica Mosher; Chapter 2 by Hervé Boulhol, Anna D'Addio and Kristoffer Lundberg with the help of Andrew Reilly; Chapter 3 by Pablo Antolín and Stéphanie Payet; Chapter 4 by Nina Paklina and Stéphanie Payet with the assistance of Pablo Antolín; and Chapter 5 was prepared by Pablo Antolín, Adele Atkinson, Debbie Harrison, Flore-Anne Messy and Juan Yermo. Editorial support was provided by Edward Smiley, Patrick Love and Kate Lancaster.

Financial help from various institutions is gratefully acknowledged. Support was received from the European Commission under the project "Evaluating pension and modelling policies in OECD and EU countries: Round 6. Part II: Retirement Savings Adequacy: Saving for retirement and the role of private pensions in retirement readiness". The research on private pensions contained in this publication has also benefited from the financial support of Allianz Asset Management, International Pensions and Allianz Global Investors, AXA, BBVA, the MAPFRE Fundation, and Risklab.

Monika Queisser and Stefano Scarpetta of the Directorate for Employment, Labour and Social Affairs, and Adrian Blundell-Wignall and André Laboul of the Directorate for Financial and Enterprise Affairs provided useful advice and feedback.

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Demographic change and economic stagnation put pressure on pension systems

Pension systems are facing crucial and far-reaching challenges. The economic crisis led to a reduction in governments' revenues to finance retirement promises and to a loss of public confidence in private pensions in many countries. At the same time, pension systems also have to deal with the problems posed by population ageing and the current economic environment.

Pensions are under pressure from the retiring of the baby boom generations, the improvements in mortality and life expectancy, and the longevity risk coming from the uncertainty around future improvements in life expectancy. Population ageing is leading not only to an increase in the number of people in retirement relative to the size of the working age population, but also most importantly to an increase in the number of years that people spend in retirement. While living longer and healthier lives is fundamentally good news, population ageing challenges the financial sustainability, solvency and adequacy of pension systems.

The current economic environment characterised by low returns, low interest rates, and low growth in advanced economies is compounding these problems. These factors may lead to lower resources than expected to finance retirement promises or simply lead to lower retirement income. Low returns reduce the expected future value of contributions as assets accumulated will grow at a lower rate than expected. Low interest rates may reduce the amount of pension income that a given amount of accumulated assets may be able to deliver, especially in defined contribution (DC) pensions. Additionally, low economic growth may reduce the overall resources available to finance pension promises.

Fortunately, policy makers are responding, through a combination of measures, increasing coverage; encouraging higher contributions – especially in complementary funded private pensions; adjusting benefits; and extending contribution periods, especially by postponing retirement.

Countries have accelerated the pace of pension reforms to stabilise public pension expenditure while addressing concerns about whether pensions will be adequate in ageing societies. A majority of countries have implemented reforms that have partially addressed the problems of fiscal sustainability, such as planned increases in the statutory age of retirement, and linking benefits, retirement age and/or maximum contribution periods to future improvements in life expectancy. However, linking pension parameters to life expectancy might be regressive when the potential impact of differences across socio-economic groups is accounted for. Yet, adjusting those links to correct for these undesirable features is a very complex issue.

Countries have also introduced reforms to strengthen funded private pensions and improve their complementary role in ensuring that retirement income is adequate. In response to the diminished trust of the public in private pensions, the OECD, in coordination with pension regulators across OECD countries, is updating the OECD Core Principles of Occupational Pension Regulation. The objective is twofold: first, to expand the Principles' scope to include all funded pension arrangements; and second to strengthen the regulatory framework of funded pension systems in order to promote sound and

reliable operation of private pension plans and thereby protect members' savings. Additionally, the OECD Roadmap for the Good Design of DC Pension Plans, *approved and endorsed by pension regulators in OECD countries, provides guidelines on designing these types of pension plans to strengthen the retirement income stemming from them and avoid future pitfalls.*

Population ageing and in particular longevity risk pose additional problems for funded private pensions. Pension funds and annuity providers need financial instruments to facilitate the management of the longevity risk to which they are exposed. Requiring the use of regularly updated mortality tables that include future improvements, and introducing measures to encourage standardised, index-based longevity hedges are essential to address the problem posed by longevity risk on pension funds and annuity providers.

The complementary role of funded private pensions depends on factors such as coverage rates, time of retirement and the economic environment. Unfortunately, the current economic environment of low returns and low interest rates does not bode well for funded pensions. Postponing retirement helps in this regard; it not only addresses fiscal sustainability problems but also increases retirement income in funded plans and thus improves retirement income adequacy.

The best approach to reaching high coverage rates is to compel individuals to save for retirement. However, when this is not a viable option, automatic enrolment programs are a good second best policy alternative. Although automatic enrolment programs have been successful in increasing coverage in voluntary funded private pensions, their success is not guaranteed. Their implementation requires carefully identifying the population subgroups which are more in need of higher coverage; reducing entry barriers to automatic enrolment schemes; defining default contribution rates in line with the overall structure of the pension system; carefully assessing its complementarity with other existing incentives, especially tax incentives; and accompanying their launch with effective communication campaigns.

National pension communication campaigns are key tools to convey the need for reforms and to explain to people what they need to do. Successful campaigns are driven by clear, realistic and well-targeted objectives that produce outcomes that can be measured, evaluated and monitored against their goals and processes. In addition, individual pension statements could be used to engage and encourage people to take proactive steps as regards their retirement by increasing contributions and postponing retirement.

Despite all the reforms already implemented, a lot of work remains to be done to address the challenges that population ageing and the global economic environment pose for pension systems. Important issues such as balancing sustainability and adequacy; diversification between public and private pensions; tackling the high costs of running funded private pensions; the conflicts of interest of pension advisers; and improving the structure of the pay-out phase of defined contribution pensions by encouraging annuity products, remain on the agenda for future editions of the OECD Pensions Outlook.

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Executive summary

This edition of the *OECD Pensions Outlook* explores how pension systems are responding to the challenges they are facing. Population ageing and the challenging economic environment characterised by low returns, low growth and low interest rates, create serious problems for pension systems, affecting both pay-as-you-go (PAYG) financed public pensions and funded pensions.

Contributing more and for longer periods partially addresses the challenge that population ageing poses to pension systems

As a result of population ageing and, in particular, the continued improvements in mortality and life expectancy, PAYG pensions face financial sustainability problems, defined benefit funded pensions need to secure their continued solvency, and defined contribution (DC) pensions need to consider ways to ensure that individuals have an adequate income during retirement. Contributing more and for longer periods, especially by postponing retirement as life expectancy increases, is the best approach to face these challenges.

Pension funds and annuity providers are exposed to longevity risk owing to uncertainty about future improvements in mortality and life expectancy. To address the risk of unanticipated increases in liabilities, regulators and policy makers should ensure that pension funds and annuity providers use regularly updated mortality tables, which incorporate future improvements in mortality and life expectancy. The regulatory framework could also help ensure that capital markets offer additional capacity to mitigate longevity risk, by addressing the need for transparency, standardisation and liquidity. Index-based financial instruments and the publication of a longevity index to serve as a benchmark for the pricing and risk assessment of longevity hedges would be helpful in this regard. Furthermore, the regulatory framework should recognise the reduction in risk exposure these instruments offer.

Countries are accelerating the pace of pension reforms in order to stabilise both unsustainable government debt and public pension expenditure while addressing adequacy concerns in ageing societies

Most countries have been very active in changing their pension systems between February 2012 and September 2014. A majority of countries implemented reforms to improve the financial sustainability of their pension systems; some have done so while maintaining or improving the retirement-income adequacy for vulnerable groups. Only a few countries – those hit more severely by the economic crisis – resorted to nominal benefit cuts. A larger number increased taxes on pension income or contributions to public

defined benefit schemes, while reducing or deferring the indexation of pension benefits was widely used to mitigate spending.

Many countries have planned increases in the statutory retirement age, thereby enlarging the contribution base while preserving adequacy for those effectively working longer. Work incentives have been strengthened through tighter access to early-retirement and/or increased financial incentives to work. Measures to curb pension administration costs to obtain efficiency gains have been quite common.

To address income adequacy concerns some countries have extended the mandatory coverage of pension benefits to previously excluded groups (such as self-employed workers), and others have introduced new benefits. A number of countries have increased mandatory contributions to funded DC schemes. And policies to increase diversification and secure private pensions savings have also been common in the aftermath of the financial crisis.

A combination of higher coverage rates, contribution levels, effective age of retirement and a positive economic environment would enhance the complementary role of private pensions

Private pensions play an important role in supporting the adequacy of retirement income. Yet they do not generally represent the main source of retirement income with the exception of higher income individuals. Younger generations may be more likely than older generations to rely on private pensions at retirement, except in countries where private pensions have already been in place for a long time.

Policy options to increase the complementary role of private pensions include increasing coverage rates, for example, through compulsion or automatic enrolment; encouraging people to contribute more and for longer periods, for example, by postponing retirement; targeting population subgroups that need better access to private pensions; and improving the alignment between public and private pensions. A positive economic environment with higher returns on assets and higher productivity growth would also help.

The success of automatic enrolment schemes in raising private pension coverage depends on its design, the communication and education campaigns that accompany its launch and implementation, and the interaction with other existing incentives

The available evidence from six OECD countries shows that automatic enrolment has a positive impact on coverage. However, coverage levels are not yet on par with those found in mandatory systems. The main elements of a consistent policy strategy for automatic enrolment programmes to successfully increase coverage include identifying which population subgroups would need higher private pension coverage; making sure that entry barriers to automatic enrolment schemes (e.g., age or earnings level) do not prevent people from beginning to contribute early and do not exclude individuals who may benefit from a complementary private pension; defining default contribution rates in coherence with the overall pension system; carefully assessing its complementarity with other existing incentives; and developing effective communication and education campaigns to accompany its launch and implementation. Employers often have an essential role in administering automatic enrolment but can incur substantial compliance costs on top of

any contributions. Costs to the State mainly relate to subsidies and matching contributions.

Pension statements and national pension communication campaigns (NPCCs) are key tools to the success of pension systems addressing the challenges they face

Individual pension statements should provide clear simplified information. Ideally, they should combine information from all national pension sources relevant for the individual. Organisers of pension statements should set clear and measurable objectives. The pension statement should aim to engage and encourage members to take active actions to improve adequacy of retirement income, for example, by increasing contributions and/or postponing retirement. Policy makers need to evaluate whether the pension statement should provide pension projections given the trade-off between simplicity and the potential effect of projections on encouraging active choices.

NPCCs should ideally form part of an overall national strategy and major events such as pension reforms and crises call for specific NPCCs. Successful NPCCs are driven by clear, realistic and well-targeted objectives that produce outcomes that can be measured, evaluated and monitored against their goals and processes. Robust evaluation processes are thus essential. Evaluation should form an essential element of the campaign budget, even where resources are limited. NPCCs should avoid having multiple messages and should focus on less accessible groups. Finally, policy makers should find ways to harness the power of the press, use innovative communication channels, and develop outreach programmes to increase engagement.

Chapter 1

Responding to the challenges posed by population ageing and longevity risk

This chapter discusses the impact of population ageing and stresses how future improvements in mortality and life expectancy may affect pension systems. The chapter focuses thereafter on how to address the challenges faced by funded pension systems coming from the uncertainty around future improvements in mortality and life expectancy (i.e., longevity risk). It first describes the mortality tables commonly used by pension funds and annuity providers to value their liabilities, then assesses the amount of longevity risk that those mortality tables may implicitly have, and finally discusses policy options to address longevity risk.

The ageing of populations poses significant challenges for the economy in general and for pension systems in particular. This chapter first discusses population ageing by introducing past and future trends and examining the main contributing factors. Secondly, it briefly highlights the impact of population ageing on the broader economy and discusses its impact on pension systems. The discussion of the impact that population ageing has on pension systems focuses on both PAYG-financed defined benefit pensions (generally public) and funded pensions (generally private), which includes defined benefit (DB) and defined contribution (DC) pension plans. The analysis stresses two messages in particular for DB and DC pension plans. Firstly, people need to contribute and to contribute for long enough periods, ideally to keep the ratio of the number of years contributing to the number of years in retirement at a certain level. Secondly, policy makers need to address the problem posed by future improvements in mortality and life expectancy, especially for pension funds and annuity providers.

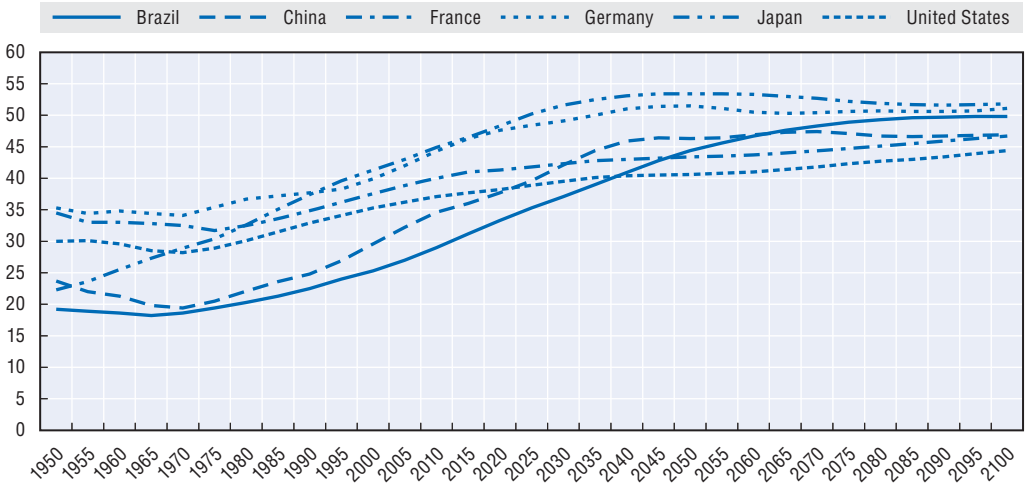
The chapter then focuses on longevity risk. Pension funds and annuity providers risk experiencing unexpected increases in their liabilities as a result of unanticipated improvements in mortality and life expectancy, and individuals run the risk of outliving their retirement savings. The OECD recommends in its Roadmap for the Good Design of Defined Contribution Pension Plans that people receiving most of their retirement income from DC pension plans may need to annuitize part of their assets accumulated to protect themselves from longevity risk.[1] Thereafter, Section 1.4 assesses the amount of longevity risk that pension funds and annuity providers may be exposed to by relying on at the standard mortality tables commonly used in different countries. Section 1.5 discusses options to manage longevity risk and some of the conditions that may be required in order to develop capital market solutions for hedging longevity risk.

1.1. Population ageing

Population ageing is generally defined as an increase in the median age of the population. Figure 1.1 below shows that the median age of the population in a selected number of OECD and non-OECD countries has increased more than 10-15 years since the 1950s, and is projected to continue increasing for several more decades.

This ageing of the population is driven partly by declines in fertility rates from the high levels following the post-WWII generations and partly from increases in life expectancy. These trends translate into fewer young people and an increasing number of older people, which has pushed up the median age. In most OECD countries fertility rates increased significantly in the first decades after WWII, but by the late 1960s or early 1970s had returned to previous or lower levels and have remained more or less constant since then (Figure 1.2). The post-war explosion in fertility is the so-called “baby boom”, which resulted in a population cohort larger in size than the preceding and succeeding generations. In contrast to the pattern in OECD countries, fertility rates in developing countries have continued to fall over the last decades. Meanwhile mortality rates have continued to

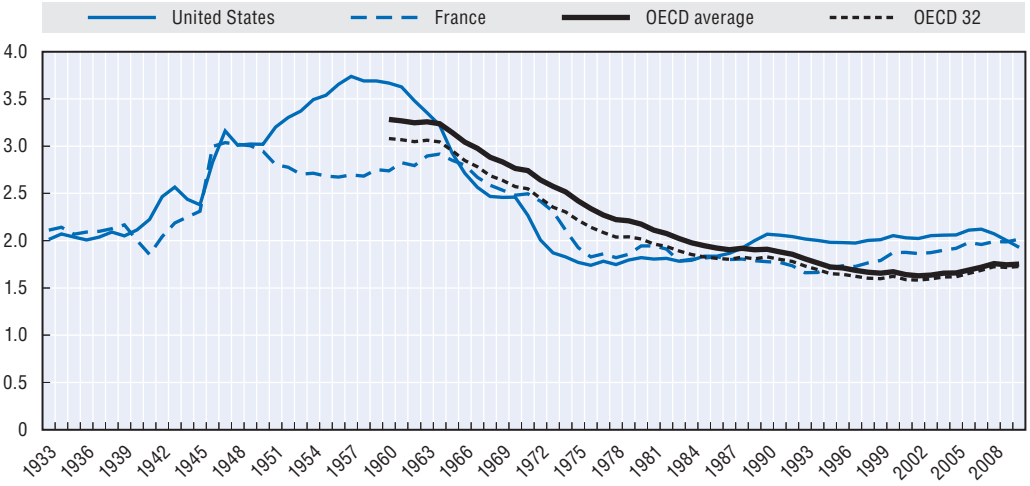
Figure 1.1. **Increase in the median age of the population for selected countries, 1950-2100**



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2012 Revision.

StatLink http://dx.doi.org/10.1787/888933156665

Figure 1.2. **Fertility rates fall and stabilize at lower levels in OECD countries**



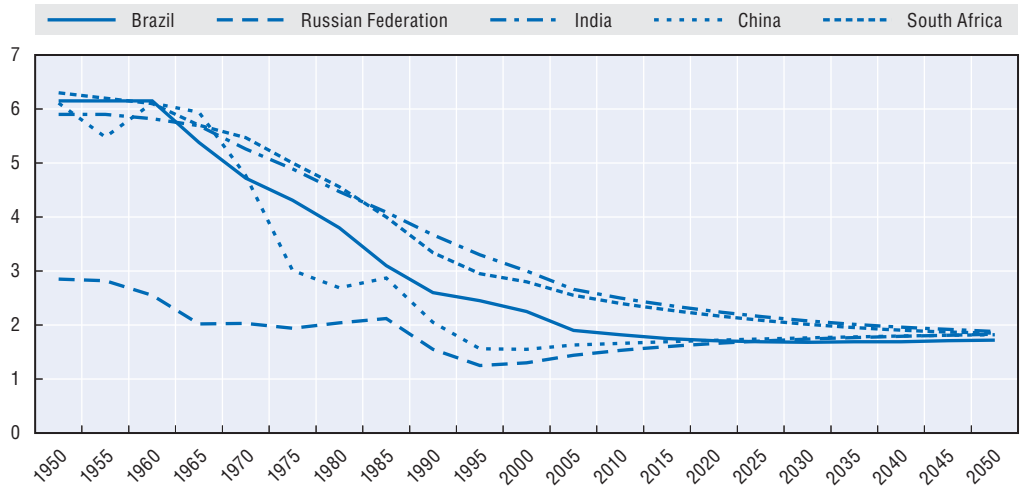
Source: Human Fertility Database, INSEE and OECD Family database. OECD 32 is an OECD average excluding Mexico and Turkey.

StatLink http://dx.doi.org/10.1787/888933156671

decline in OECD and non-OECD countries alike resulting in significant increases in life expectancy (Figure 1.4). Life expectancy at birth and at age 65 has increased on average by 2.2 years and 1 year per decade, respectively, since 1960 (Table 1.1).

As a result of population ageing, the old-age dependency ratio will increase markedly. Figure 1.5 shows that the number of people of working age per person aged 65 or above – the inverse of the old-age dependency ratio – will fall in OECD countries from an average of around four people of working age per retiree (around 9 for developing countries, Brazil and China) to somewhere between one and two persons of working age per retiree. As a

Figure 1.3. **Fertility rates in developing countries will continue to fall**



Note: Fertility rates and projections in the BRICS, 19950-2050 (Children per women).
Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2012 Revision.

StatLink http://dx.doi.org/10.1787/888933156686

Table 1.1. **Average increase in life expectancy per decade over specified period in selected OECD countries**

(years per decade)

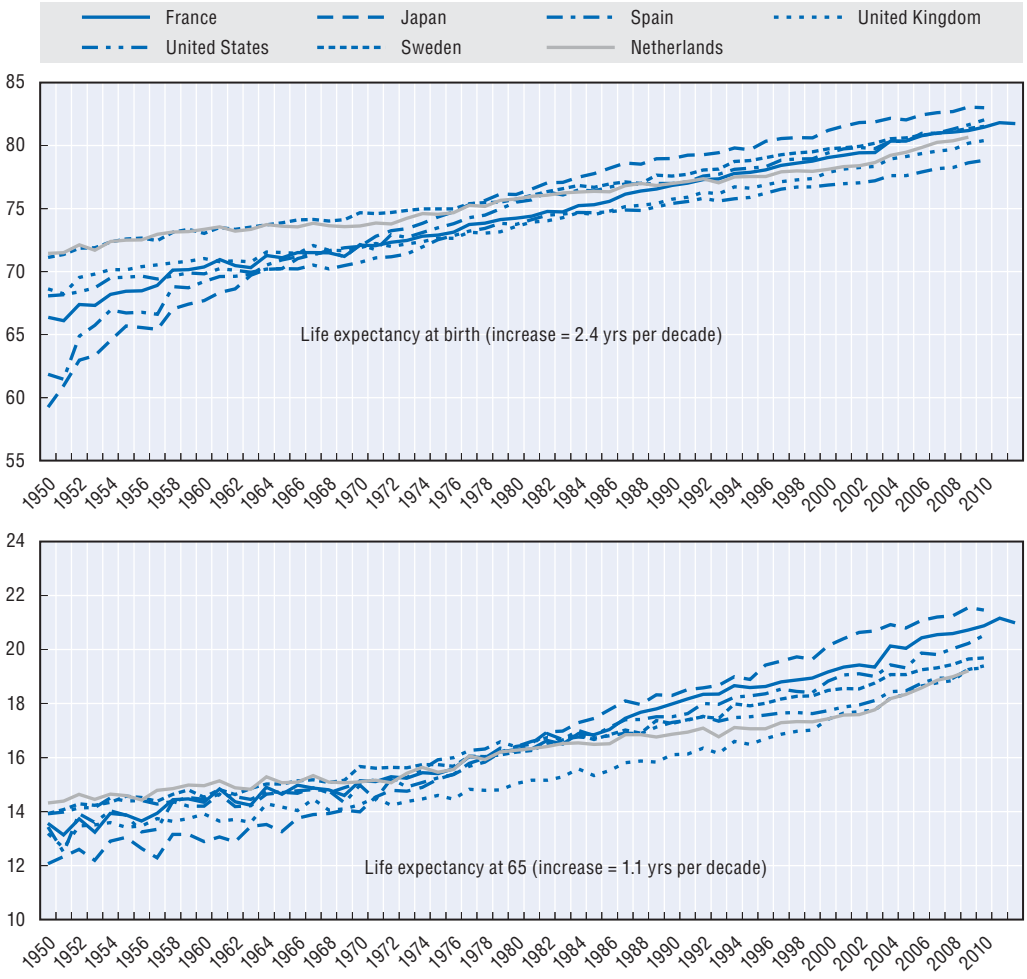
	1900-50	1950-2000	1950-2010	2000-10
		At birth		
France	4.1	2.5	2.5	2.4
Japan	..	4.4	4.0	2.1
Spain[1]	4.8	3.5	3.4	2.5
United Kingdom[2]	4.1	1.8	2.0	2.6
United States[3]	4.2	1.8	1.8	2.0
OECD average[4]	..	2.3	2.4	2.7
		At age 65		
France	0.5	1.1	1.2	1.7
Japan	..	1.5	1.6	1.6
Spain[1]	0.6	1.0	1.2	1.6
United Kingdom[2]	0.5	0.8	1.0	2.0
United States[3]	0.7	0.8	0.9	1.7
OECD average – Females[4]	..	1.0	1.2	1.7
OECD average – Males[4]	..	0.7	0.9	1.9

.. Means not available.
1. Data for the period 1900-50 refer in fact to the period 1908-50.
2. Data for the period 1900-50 refer in fact to the period 1922-50.
3. Data for the period 1900-50 refer in fact to the period 1933-50.
4. The OECD average life expectancy has been calculated for each year between 1960 and 2010 on the basis of the available data. The countries used in the calculation of the average may differ from one year to another, but only in the early decades. Data for the period 1950-2000 and 1950-2010 refer respectively to 1960-2000 and 1960-2010.

Source: Human Mortality Database.

StatLink http://dx.doi.org/10.1787/888933156720

Figure 1.4. **Evolution of life expectancy at birth and at age 65 in selected OECD countries, 1950-2012**



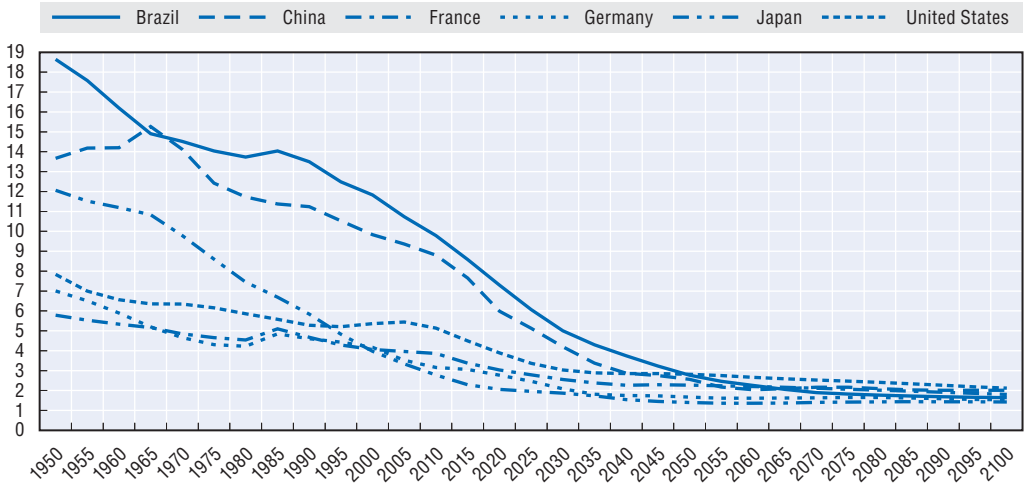
Source: Human Mortality database.

StatLink http://dx.doi.org/10.1787/888933156695

consequence, there will be fewer people in the workforce per retiree than today, which with all else equal will put tremendous pressure on economies in general and on pension systems in particular.

Increases in life expectancy are the main driving force behind population ageing, particularly in the long term. While the impact of the baby boom (the cohorts born when fertility rates were high) is a significant factor, its impact will be temporary as these cohorts pass away. In contrast, the increases in life expectancy are more permanent and are expected to continue. The ratio of people of working age relative to people aged 65 or above (Figure 1.5) is driven in the next 20 years by both the baby boom and improvements in life expectancy, and by improvements in life expectancy alone thereafter. Improvements in life expectancy will be the only driving force as long as fertility rates are constant (as it has been for the last several decades) and thus the cohorts entering the labour market will be the same size as the ones exiting into retirement.

Figure 1.5. **Proportion of the working age population compared to the population aged 65 or more in selected countries**



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2012 Revision.

StatLink http://dx.doi.org/10.1787/888933156707

The implication of these observations is that the policies required to address population ageing differ depending on whether the focus is on the medium term – the baby boom cohort – or on the long term, on increasing life expectancy. In order to address the impact of increases in life expectancy for the long term, policies need to focus on making sure that people contribute sufficient amounts to savings by encouraging contributions, as well as ensuring that people save for long enough, for example by delaying the age at which they retire.

1.2. The impact of population ageing on the economy

Population ageing has several potentially important economic effects (Martins et al., 2005). One way in which ageing may have an impact on GDP is through its impact on productivity. A number of studies argue, for example, that productivity is expected to fall with age. As cognitive knowledge does likely fall with age, this argument has some intuitive appeal. However, some types of knowledge and skills increase over time with learning and experience, that is, they may increase with age, which runs counter to the argument of decreasing productivity. Unfortunately, using actual data of people in the labour market to assess whether productivity increases with age may be susceptible to self-selection bias, as potentially only people with the highest productivity remain in the workforce.

Population ageing could also have a negative impact on GDP growth to the extent that it leads to a smaller workforce. As the baby-boom cohorts retire and are replaced by smaller cohorts, the workforce will shrink. However, if fertility rates remain constant, the workforce will also remain constant once the baby-boom cohorts have exited the labour force, all else equal. Additionally, policies aiming at increasing participation rates – in particular among workers aged 55 and older – and policies that encourage later retirement would be expected to increase the effective retirement age, which may offset if not reverse the reduction of the size of the total workforce.[2]

There are, however, other ways in which population ageing could have a negative impact on GDP growth, for example through changes in savings patterns across generations. To the extent that retirees' saving rates remain lower than those of the working age population, overall savings will fall with population ageing. However, if working people over the age of 40 have higher saving rates than younger workers, the increase in the average age of the population may actually increase saving rates. Ultimately this is an empirical issue which depends on the structure of the population and the different saving rates across different population subgroups in each country.

Similarly, the effect of ageing on national savings would also affect total investment or its composition. Total investment might fall as a result of lower national savings, or it might remain constant, in which case borrowing from abroad would need to fill the gap.

Population ageing might also have an impact on financial markets. Effects which are often cited include the impact on portfolio strategies, asset prices, and the impact on annuity markets. As the population ages, and in the current context as the baby-boom generation enters retirement, there may be a tendency towards higher portfolio allocations to fixed-income securities. Life-cycle strategies or target date funds would serve to increase the relative share of fixed-income assets, which would likely have an impact on equity valuations. The asset meltdown hypothesis is an extreme case of this scenario whereby the drawdown of assets associated with the retirement of the baby-boom generation would result in a collapse of asset prices. However a more general equilibrium view taking into account behavioural adjustments suggests a much smaller reduction in asset prices (Martins et al., 2005). The third hypothesised effect arises from an increasing dependence on defined contribution (DC) pension plans to finance retirement, which along with increasing longevity, may prompt a surge in the demand for annuities to gain protection from longevity risk.

Population ageing will also affect public finances through pensions and healthcare. Public expenditures on healthcare are bound to increase sharply as the population ages, although this effect will be a combination of increased demand, since healthcare utilization increases with age, and rising prices, which some studies argue are one of the main drivers of the increase in healthcare expenditure (OECD, 2006). However the extent to which there is a compression or expansion of morbidity will affect the extent to which increasing life expectancy has an impact on healthcare costs. Most of the health care costs of old age occur in the years just prior to death as this period is associated with higher disability levels. If increasing life expectancy also translates into longer periods of disability, medical costs will increase. However in the scenario of the compression of morbidity, the period spent in disability will not increase and people will live longer, healthier lives. On the other hand, the increasing prevalence of age-related diseases such as Alzheimer's represents a large burden on healthcare finances.

With respect to pensions, increases in life expectancy and the retirement of the baby boomers will clearly increase the number of people with claims on GDP, especially if the effective retirement age remains unchanged. Pensions, whether PAYG-financed or funded through assets accumulated, are a claim on GDP. The European Union projects public expenditure on pensions to increase by 1.5 to 2 percentage points of GDP in the next 50 years.[3] However, the increase from one country to the next varies significantly. For instance, pension expenditure in the United States is expected to increase by 1.8 percentage points (pp) of GDP over the next 50 years, compared with 0.5 pp in France,

2.8 pp in Germany and 1.5 pp in the United Kingdom, even taking into account several factors which could offset the full impact of ageing populations such as increased labour force participation (European Commission, 2012). The next section discusses more in detail the impact of population ageing on pensions.

1.3. The impact of population ageing on pensions

The main impact of population ageing on pensions, in particular in the long-term, is through increases in life expectancy. The extent to which increasing longevity will impact pensions is driven by the changes in the relationship between what goes into and what comes out of the pension pot. The future value of savings is what it goes into the pension pot and it is determined by the level of contributions to pension savings, the contribution period and the rate of return on these contributions, whether guaranteed or subject to the investment return of the market. The present value of pension payments is what it comes out of the pension pot and it will primarily depend on the level of pension payments or pension promises, and the length of time which the payments will be made, which in turn depends on the age of retirement and is clearly impacted by increasing life expectancy. If the age of retirement remains constant, the relationship between these two variables will change with increasing life expectancy as the length of time which pensions are paid out increases as a proportion of the time spent saving for retirement. This situation will most likely result in insufficient assets and/or resources for financing retirement. In order to address this either higher contribution rates or longer periods of savings will be required.

The retirement of the baby-boom cohort will also have a significant impact on pensions. The large cohort of baby-boomers retiring from the workforce is being followed into the workforce by a much smaller generation, resulting in fewer active persons for every retired person. For PAYG-financed pensions, contributions will therefore not be able to cover all pension payments, and net pension expenses along with debt will also increase. Moreover, the retirement of the baby-boom generation may also have a negative impact on investment returns, as discussed above, thus reducing the future value of savings. Nevertheless, the impact of the baby boom is temporary, while the increases in life expectancy are expected to continue.

The impact of population ageing varies according to the type of pension arrangement as each arrangement involves different drivers for the calculation of the future value of savings and the present value of pension payments. For PAYG-financed public pensions, population ageing will create *sustainability* problems. To the extent that pension benefit promises are not in line with the expected increases in life expectancy, the present value of pension payments will be underestimated. Moreover, the retirement of the baby-boom generation will result in a decrease in the number of active employees making contributions to pay for these pensions and an increase in the number of people receiving pensions. A decrease in contributions, an increase in retirees and longer periods for which the payments have to be paid out will lead to a misalignment between current contributions and value of benefit payments. These drivers will translate into large increases in public pension expenditures that will strain public finances.

Public pension expenditure is projected to increase by 8 to 10 percentage points of GDP as a result of population ageing (Table 1.2). However, government policies on future coverage of public pensions, labour market participation and employment ratios along with the ratio of pension benefits to productivity are expected to largely offset the impact of population ageing on public pension expenditure (last three columns in Table 1.2). However, there are some important questions to consider regarding the real offsetting impact of these factors. Will governments manage to reduce coverage ratios by increasing the effective retirement age? Will employment ratios increase for older workers over the age of 55? Will average pension benefits increase at a lower rate than average productivity, particularly given the trend towards more women having full working careers?

Table 1.2. **Contributions of the main drivers to the projected increase in public pension expenditure from 2010 to 2060 for selected EU countries**

Country	Total	Dependency Ratio	Coverage	Employment	Benefit Ratio
France	0.7	9.1	-3.5	-1.2	-3.1
Germany	2.6	7.9	-1.8	-0.5	-2.2
Spain	3.6	9.7	-0.8	-2.2	-2.3
EU27	1.6	8.5	-2.9	-0.8	-2.7

Source: European Commission 2012 projections.

StatLink http://dx.doi.org/10.1787/888933156735

The main risk from population ageing on defined benefit funded pension arrangements is on their *solvency*. As with public pensions, if pension promises are calculated based on a life expectancy which is underestimated, the present value of pension payments will also be underestimated and actual pension payments will be larger than expected. Therefore, DB pension funds may lack sufficient assets to cover their future liabilities, and consequently their funding ratios will fall below 100% as they will need to pay pension benefits for a longer period than planned for. With respect to the future value of savings, the retirement of the baby-boom generation will potentially have a negative impact on asset values coming from a shift in preferences and portfolio allocations towards less risky assets, resulting in falling investment returns. This will result in a lower future value of assets accumulated, which may not be sufficient to meet the promised pension benefit payments.

The main impact of population ageing on defined contribution pension arrangements will be on their *adequacy*. As long as there is no level of guaranteed pension income in retirement for DC plans, the future value of pension savings and the present value of pension benefits will be equal by definition, leaving only the question of whether this amount is adequate to maintain the desired standard of living in retirement. As discussed above, returns on investment may not be as high as expected as a result of the shift in asset preferences of the older generation and lower potential economic growth as a result of lower workforce growth. In addition, accumulated assets must fund longer retirement periods if people do not adjust their retirement age. Therefore people will have to save at a higher rate or for a longer period in order to accumulate sufficient assets to finance retirement.

Addressing the impact of population ageing on pensions

The OECD recommends diversifying the sources to finance retirement and encouraging complementary funded private pensions. Consequently, a pension system should be comprehensive and include a PAYG-financed component, whose size depends on political choices, as well as a funded component. The latter will include occupational as well as personal funded pension plans, normally run by private institutions.

The discussion in previous sections highlighted the impact of population ageing on the different types of pension arrangements. The main risks faced if current assumptions remain the same, particularly with respect to life expectancy, are sustainability for PAYG financed pensions, solvency for DB funded pensions and adequacy for DC plans.

Linking the age at which a person retires and begins collecting a pension, the retirement age, to changes in life expectancy would go a long way to addressing the problems posed by population ageing on PAYG-financed pensions (OECD, 2012). An alternative option could be to link the number of years contributing or saving for retirement to improvements in life expectancy (e.g. France). In this way people entering the labour market at different ages will be required to have the same saving effort in terms of years contributing. Moreover, it may also to some extent adjust for differences in life expectancy according to different socio-economic characteristics (Box 1.1).

Adjusting actuarial pension parameters regularly and automatically will also help in addressing sustainability and solvency problems. One of the main features of DC pension arrangements is that the link between contributions and pension benefits is direct and straightforward. Notional defined contribution arrangements (e.g., Italy, Poland, or Sweden) create a direct link between contributions and benefits in PAYG-financed public pensions. NDC arrangements allow for assessments of the impact of different actuarial parameters and adjust benefits and contribution periods accordingly.

For retirement pension plans in which pension benefits depend on assets accumulated, the approach to address the adequacy problem posed by population ageing is to contribute and contribute for long periods, combined with making sure that part of the assets accumulated are annuitized.[4] Any analysis of the impact of ageing on pension systems also needs to keep recent developments in mind, such as the increased prevalence of retirement pension plans in which benefits depend on assets accumulated (e.g. 401(k) plans in the United States and Riester plans in Germany), which have become in some countries the main source to finance retirement.

A direct approach to increase accumulated contributions and/or contribution periods is to postpone retirement. However, one needs to keep in mind that mortality rates and life expectancy are different across different socio-economic groups (Box 1.1). Additionally, in order to increase overall savings for retirement it is necessary to increase participation in funded pension systems. This could be achieved through improvements in the design of incentives, especially around matching contributions and auto-enrolment mechanisms, as in New Zealand and the United Kingdom (Chapter 4 and 6 OECD, 2012).

These types of pension plans, like DC plans, bring to the forefront the importance of designing the payout phase adequately in order to provide protection from longevity risk and allocate accumulated assets efficiently to make sure pension benefits are as adequate as possible. In this regard, there is a need to strike a balance between flexibility and liquidity on one side and protection from longevity risk on the other. Increases in life expectancy are uncertain by nature and, therefore, individuals whose main source of

Box 1.1. **Life expectancy across different socio-economic groups**

Life expectancy differs across various socio-economic groups of the population. Indeed, while populations of developed countries have been experiencing dramatic increases in life expectancy, as reported previously, numerous studies have demonstrated persistent and sometimes increasing differences in life expectancy across socio-economic groups (Adam, 2012, 2014; Blanpain and Chardon, 2011; ONS 2011; and Society of Actuaries 2000, 2014), with occupational classification commonly used as a proxy for socio-economic status. These studies have been carried out for Canada, France, United Kingdom and the United States by statistical institutes (France and the United Kingdom) and by the actuarial organisations (Canada and the United States). Statistical organisations in France and the United Kingdom have defined standardized occupational based socio-economic classes to be used in data collection and statistical exercises which have been used to analyse inequalities with respect to mortality.[1] In the United States, the Society of Actuaries has collected mortality data from public and private pension plans to develop mortality tables, for which they also distinguish between blue and white collar plans. In Canada, work commissioned by the Institute of Actuaries reported mortality data according to different income groups for pensioners.

The most recent difference in life expectancy at age 65 between the highest and lowest socio-economic groups shown in the figures below is 3.8 years in France, 2.6 years in England & Wales and 2.7 in the United States. Moreover, the difference has increased over the span of around two decades, by 1.2 years in France, 0.5 years in England & Wales, and 1.1 years in the United States.

Differences in life expectancy have implications for the ratio of years contributing to pensions to years spent in retirement. Given a certain number of years spent contributing, this ratio will be lower for people with higher life expectancy (e.g., blue collar, higher income, or people in higher occupation levels). According to the data on life expectancy across various socio-economic groups reported above, those in higher socio-economic groups will receive pension payments for longer periods than those in lower socio-economic groups assuming these two groups retire at the same age.

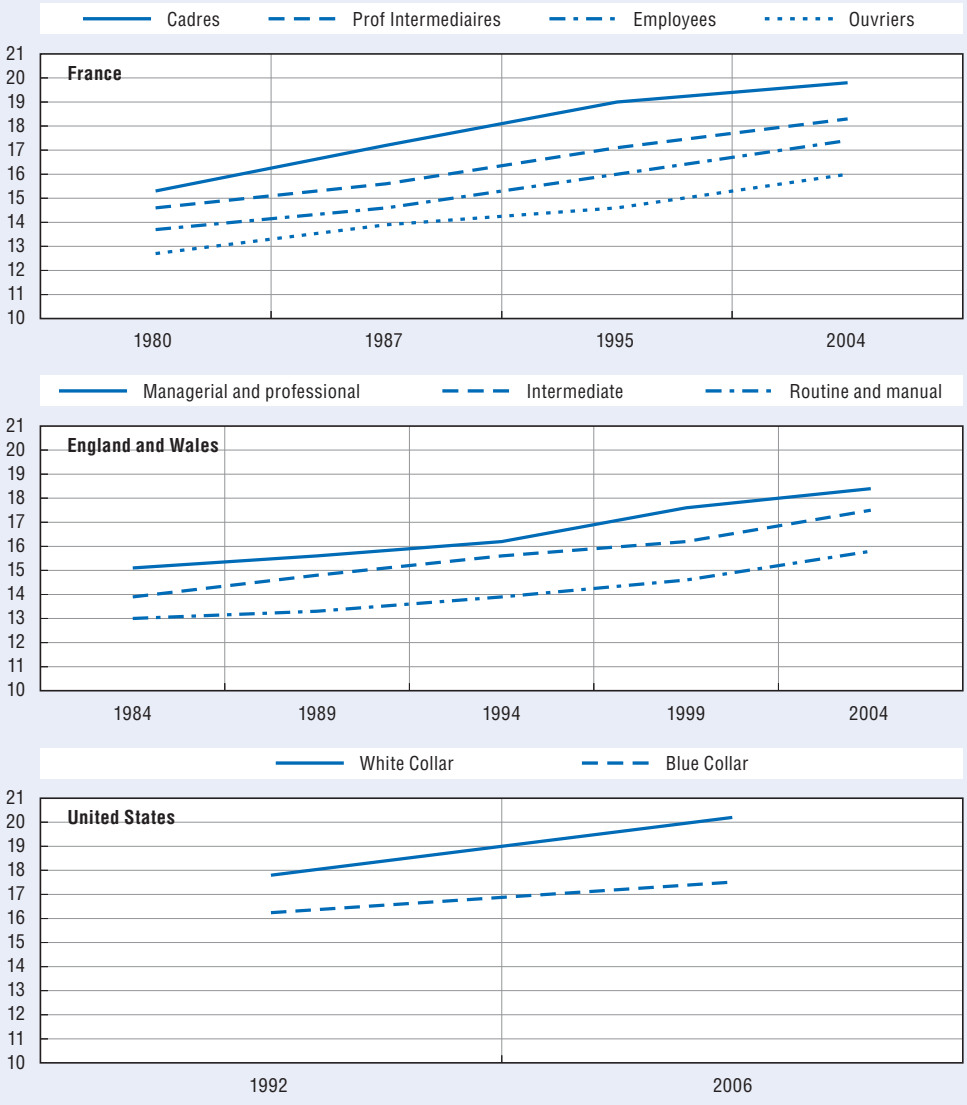
The age of entry into the labour market also has an impact on this ratio as it affects the number of years spent saving to finance retirement for a given retirement age. Differences across socio-economic groups with respect to the number of years spent contributing to pensions could exist to the extent that those in higher socio-economic groups may enter the labour market later than those in lower socio-economic groups as they may spend more years in education. This would imply that individuals in lower socio-economic groups spend a longer time contributing to pensions for a given retirement age, resulting in a higher ratio of years contributing to years in retirement as compared to an individual in a higher socio-economic group.

Furthermore, the disparity of this ratio across socio-economic groups could increase in the future to the extent that higher socio-economic groups also experience higher mortality improvements. The figure below clearly shows that white collar workers in the US have experienced a more rapid increase in life expectancy compared to the blue collar workers. The same is true for England & Wales and France. The Canadian studies on pensioners found significant differences in the mortality trend over the last 15 years for the highest income group, particularly for males aged 60-75, with differences surpassing even 1% of annual improvement for some age groups (Adam, 2012). If this type of pattern were to continue, the ratio of years contributing to years in retirement for higher socio-economic groups would decrease more than for lower socio-economic groups.

1. Socio-professional categories (CSP) in France and the National Statistics Socio-economic Classification (NS-SEC) in the United Kingdom.

Box 1.1. **Life expectancy across to different socio-economic groups**
(cont.)

Evolution of male period life expectancy at age 65 across socio-economic groups[1]



1. Period life expectancy reflects the mortality of a given year and makes no assumption regarding future changes in mortality.
Source: Blanpain and Chardon, 2011; ONS, 2011; Society of Actuaries 2000, 2014.

StatLink http://dx.doi.org/10.1787/888933156717

retirement income may come from these pension plans need to have some of their balances allocated to a life annuity that protects them from longevity risk. However, they also need flexibility and liquidity during the first years in retirement to be able to address any contingencies (e.g. pay down debts, health care). It is in this context that the OECD recommends to combine programmed withdrawals during the first years in retirement

with a deferred life annuity that starts paying later in retirement, for example at age 80 (OECD, 2012).[5]

Support for partial annutization of the balances accumulated in DC pension plans brings the attention to annuity markets. Annuity markets face several challenges. On the demand side, there are problems of framing (annuity products are not investment products but insurance) and taxation that deter individuals from purchasing annuities. On the supply side, apart from adverse selection, the main problem facing annuity providers is how to manage longevity risk, in particular, when there are not sufficient or appropriate instruments to hedge longevity risk.

The remaining of the chapter focuses first on assessing the amount of longevity risk faced not only by providers of annuity products (e.g. insurance companies) but also by pension funds providing defined benefits. A discussion of options to manage longevity risk follows thereafter.

1.4. Mortality assumptions and longevity risk

Future improvements in mortality and life expectancy can pose serious problems for funded pension plans and annuity providers. Pension plans and annuity providers promise to pay retirees a certain level of future income and they need to set aside reserves or funds in order to meet their future payment obligations. The amount necessary is driven by two main factors: the return on the assets under management and how long the payments will be made. Analogous to a discount rate being assumed to account for the time value of money, assumptions must also be made regarding mortality rates to determine how long payments are expected to be made, as payments are usually paid until the death of the retiree. While investment returns could be negatively impacted by the ageing of the population, as discussed above, this section focuses on addressing the potential impact of increasing life expectancy on the solvency of pension plans.

The uncertainty around future mortality rates and the longevity risk coming from underestimating life expectancy stems largely from the uncertainty as to how mortality will evolve and the future improvements in mortality rates.[6] Figure 1.4 showed that expectancy for individuals aged 65 has increased by an average of around one year per decade. Each additional year of life expectancy not provisioned for can be expected to add approximately 3-4% to current liabilities. Thus the improvements in mortality cannot be ignored when establishing the mortality assumptions which determine how long pension and annuity payments are expected to be made.

Despite this risk, mortality assumptions used to value pension and annuity liabilities do not always receive the necessary attention. Regulation does not consistently acknowledge the need to account for the improvements in mortality, and though in practice pension sponsors often do provision for these improvements, this is not always the case and assumptions can sometimes be out of date and not reflective of recent mortality experience.

The analysis in this section shows a potential shortfall of provisions for future pension and annuity payments in several of the countries examined based on standard mortality tables used.[7] The magnitude of this potential shortfall proves the need for regular monitoring of mortality experience and for updating the mortality assumptions accordingly. While countries failing to account for increasing longevity in their regulatory and market tables are also those who face the most significant potential shortfall in liabilities, even countries where improvements are assumed but not reflective of recent

experience could find that they are exposed to a moderate to significant shortfall in provisions for pensions or annuities.

Mortality assumptions in the regulatory framework and in practice

This section examines the mortality tables commonly used by pension funds and annuity providers to provision for future improvements in mortality and life expectancy. It looks at whether these standard tables include future improvements in mortality and life expectancy and how those improvements are incorporated. The regulatory framework can require specific mortality tables to be used. These tables specify minimum mortality assumptions and may or may not account for future improvements in mortality and life expectancy. However when minimum tables are required, pension funds and annuity providers are also typically allowed to use mortality tables that are more conservative than those required so as to account and provision for larger future improvements in mortality and life expectancy if deemed to be appropriate. Where the regulatory framework does not establish specific mortality tables, pension funds and annuity providers may use their own tables or the tables most commonly used by the industry.

The extent to which mortality assumptions are regulated varies widely from one country to the next and is not necessarily consistent for pension funds and annuity providers within the same country. Table 1.3 shows *a)* whether the regulation requires minimum mortality assumptions – whether or not a specified minimum level of mortality is mandated regardless of whether this requirement includes mortality improvement – and *b)* whether the regulation requires accounting for future improvements in mortality in valuing pension and annuity liabilities, though the exact assumptions to be used do not necessarily need to be specified. The analysis also considers whether the common market practice is to account for the future improvement of mortality in the valuation of liabilities, even if regulation does not require it.

The common market practice in some countries goes above and beyond the minimum mortality assumptions technically required by law, while in other countries market practice follows the minimum requirement rather closely. Where specific tables are not mandated by regulation, industry bodies often play a role in setting the standard which pension funds and annuity providers are expected to abide by in practice.

Six of the sixteen countries assessed require a minimum level of mortality for both pension funds and annuities, and another five do not have a minimum requirement for either. Five additional countries have a minimum requirement for only one or the other.

Half of the countries assessed do not require that both pension funds and annuity providers account for future mortality improvement. Six of the sixteen countries have no requirement for annuity providers or pension funds, and two additional countries have no requirement for one or the other.

Despite the lack of a legal requirement to provision for improvements in mortality, the majority of countries do so in practice, though annuity providers do so more often than pension funds. Annuity providers in thirteen of the sixteen countries examined use mortality improvement assumptions in practice, whereas pension funds in only eleven of the countries tend to do so.

Table 1.3. **Mortality tables and improvements required by regulation and used in practice**

	Minimum table required by regulation		Mortality improvements required by regulation		Mortality improvements used in practice	
Country	Annuity providers	Pension plans	Annuity providers	Pension plans	Annuity providers	Pension plans
Brazil	No	Yes	No	No	No	No
Canada	No	Yes	Yes	Yes	Yes	Yes
Chile	Yes	Yes	Yes	Yes	Yes	Yes
China	Yes	Yes	No	No	No	No
France	Yes	Yes	Yes	Yes	Yes	Yes
Germany	Yes	Yes[1]/No[2]	Yes	Yes	Yes	Yes
Israel*	Yes	Yes	Yes	Yes	Yes	Yes
Japan	No	Yes	No	No	Yes	No
Korea	No	No	No	No	No	No
Mexico	Yes	No	Yes	No	Yes	No
Netherlands	No	No	Yes	Yes	Yes	Yes
Peru	Yes	Yes	No	No	Some	Some
Spain	No	No	Yes	Yes	Yes	Yes
Switzerland	No	No	No	No	Yes	Some
United Kingdom	No	No	Yes	Yes	Yes	Yes
United States	Yes	Yes	No	Yes	Yes	Yes

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1. For non-regulated Pensionskassen and insurance oriented Pensionsfonds.
2. For regulated Pensionskassen and non-insurance oriented Pensionsfonds.

Source: Author's calculations.

StatLink http://dx.doi.org/10.1787/888933156747

Regulatory Requirements

Behind these results there are variations in the extent to which requirements are specified and the freedom given to pension funds and annuity providers to set their own assumptions.

There are no specific regulatory minimum requirements for mortality assumptions for either annuity providers or corporate pension plans in **Korea**, **Spain** and **Switzerland**. Annuity providers in **Japan** and **Brazil** and pension plans in **Mexico** are not subject to any minimum mortality requirements either. While there are no minimum requirements for mortality itself, some countries do have stipulations regarding the experience on which assumptions are based, with **Spain** and **Switzerland** requiring that the assumptions be based on more recent experience and **Korea** having credibility requirements for the experience used for assumption setting based on the number of observations.

Requirements in **China** and **Peru** as well as for pension plans in **Brazil** and **Japan** and annuity providers in the **United States** stipulate a minimum level of mortality or life expectancy for valuing liabilities, though taking into account future mortality improvements is not required. A minimum level is also imposed for pension funds in **Canada** for solvency valuations. The minimum level to be used for US annuity providers is determined at a state level, and while some types and generations of products are required to account for future improvements the majority are not.

Specific tables accounting for future improvements in mortality are required as a regulatory minimum for valuing liabilities in **Chile**, **France** and **Israel** as well as for annuity

providers, Pensionskassen and Pensionsfonds in **Germany**, annuity providers in **Mexico** and pension plans in the **United States**.

Canada requires that standards set by the Canadian Institute of Actuaries (CIA) be followed, and as the CIA standard suggests the basis for mortality improvements, the effective regulation is that mortality improvements are included for valuation. Similarly the **Netherlands** and the **United Kingdom** require that future changes in mortality be taken into account, though the level is not specified.

For annuity providers, premiums are set based on provider discretion in all countries except **France**, where the generational tables TGH/TGF05 have been a minimum requirement for pricing annuities since 1 January 2007. However in other countries certain restrictions are imposed such as in Spain where older Swiss tables, commonly used before standard Spanish tables were developed, are now forbidden.

Market Practice

The extent to which practice deviates from the requirements above and how mortality improvements are taken into account, if at all, also varies.

No provision for mortality improvement is typically taken into account for **Brazil**, **China** or **Peru**, or for **Japanese** pension funds, and the regulatory minimum in these countries tends to be relied upon, though sometimes more conservative assumptions are used in practice. For example **Brazilian** pension funds and annuity providers often tend to use the more recent US table (US Annuity 2000 tables), though future improvements in mortality are usually still not accounted for. Additionally, some evidence indicates that annuity providers and pension funds in **Peru** do take improvements into account up through the valuation date, and may be taking future improvements into account as well. Pension funds in **Japan** are allowed to include up to a 10% margin for males and 15% for females for funding purposes, though many do not do this in practice.

No minimum tables are required for corporate pension plans in **Mexico**, and in practice they typically rely on an older table from 1997, which accounts for improvements up to a certain date.

The minimum regulatory tables incorporating future mortality improvements are normally relied upon in **Chile**, **France** and **Israel** as well as for annuity providers in **Mexico** and pensions funds in the **United States**.

While not specifically required as a minimum, standard assumptions developed by industry bodies tend to be relied upon for **Canada** (apart from solvency calculations), **Korea**, the **Netherlands**, **Spain**, **Switzerland** and the **United Kingdom**. This is also true for annuity providers in **Japan** and the **United States**. All of these standard tables account for future improvements in mortality, though for pension plans in Switzerland this has only recently been the case as historically the tables used have not incorporated improvements. Pension funds in Switzerland, however, are required by law to use mortality assumptions which reasonably reflect the actual mortality experience and therefore typically adapt the standard mortality tables to reflect the mortality of their members. The new standard tables being developed in Switzerland are generational tables (e.g. the BVG2010 and VZ2010 tables) which provide both estimates of current mortality assumptions as well account for future improvements. In Spain the mortality assumptions used must fall within specific confidence intervals, implying a requirement to take future improvement into account. For the United Kingdom the magnitude of mortality improvement is not specified by the

industry, rather a common modelling methodology has been developed to project future mortality improvements. While the tables in Korea do not explicitly account for mortality improvements, the margins are significant and thus effectively cover the risk of decreasing future mortality.

Accounting for future improvements in mortality in practice

The way in which future mortality improvements are accounted for in assumptions may also differ.

Tables developed by the Institute of Actuaries in **Japan** for annuitants are static, though they contain a margin which is meant to account for future decreases in mortality. **Korea** also issues standard tables which seem to have significant margins covering the increasing life expectancy. Pension plans in **Mexico** typically use a static table which has been improved to 2011 for males and 2013 for females.

Pension funds in the **United States** and **Canada** have the option of applying static tables projected to some future date in order to account for the improvement in mortality rather than using fully generational tables. Pension funds in the United States tend to more often use static projections, while in Canada generational tables are more commonly used. Annuity providers in both countries tend to use fully generational tables.

Fully generational tables tend to be used by both pension funds and annuity providers in **Chile**, **France**, **Germany**, **Israel**, the **Netherlands**, **Spain**, **Switzerland** and the **United Kingdom** as well as for annuity providers in **Mexico**. Two models have been developed for the estimation of future mortality rates for Switzerland: the Nolfi model which projects constant improvements into the future and the Menthonnex model which eventually converges to a lower long term improvement rate. Tables developed in the **United Kingdom** are rather flexible. Initial mortality assumptions there are often based on base mortality tables developed by the Continuous Mortality Investigation (CMI) which is supported by the British actuarial profession. However to project mortality beyond this point, the CMI has developed a model where users can specify a long term future rate of improvement, which can be set at a higher rate depending on the purpose of the calculations.

Cohort-based generational tables where future improvements are projected based on generations rather than age only have been developed in **France**, **Israel**, **Switzerland** and the **United Kingdom**.

Tables developed in **Germany**, **Israel**, the **Netherlands**, **Switzerland**, **the United Kingdom** and more recently the **United States** project improvements which vary by age across time, that is having a higher short-term improvement assumption reflecting recent improvements gradually reverting to a lower long-term trend. The recently proposed pensioners' mortality table in **Canada** also takes into account short term vs. long term trends.

Assessing longevity risk

The longevity risk for the pension fund and annuity provider is that the risk that the pensioners live longer than expected, expectations being based on the mortality assumptions being used, and that payments will have to be made longer than provisioned for. If the mortality assumptions used to value these pension and annuity liabilities underestimate the future increases in life expectancy, the fund will face challenges to its solvency position.

The general approach taken here to assess the potential longevity risk which pension plans and annuity providers may be exposed to is based on comparing the life expectancy and annuity values given by the standard mortality tables used with the life expectancy and annuity values suggested by alternative mortality projection models.

Historical population data for each country is used to calibrate four alternative models to project mortality into the future. These mortality rates are then adjusted to the level of mortality for the pensioner or annuitant population.

The potential shortfall in provisions to cover the risk of longevity of pensioners and annuitants is quantified by comparing the resulting annuity values. A smaller annuity value based on the standard table as compared to the value implied by the models indicates a potential exposure to longevity risk.

Mortality projection models

The four mortality projection models which have been used to assess the adequacy of mortality assumptions are the Lee-Carter, Cairns-Blake-Dowd, P-spline and CMI models.

The first two models listed are stochastic models, while the second two are deterministic. Stochastic models allow for assessment of longevity risk at a given confidence level, whereas deterministic models provide only a best estimate view of future longevity. Depending on the purpose of the projections, one type or the other may be preferable.

In general, the stochastic models presented here are relatively easy to understand and implement compared to the deterministic models, for which the underlying modelling is quite complex in terms of the procedures used to calibrate the parameters of the models. Beyond this broad difference, each model presents shortcomings which must be considered when interpreting the results of the projections.

The Lee-Carter model is the simplest model, and its projections maintain the pattern of improvements by age which was experienced over the historical period used for the calibration of the model. This can pose a problem, however, as in many developed countries the pattern of improvements across ages has been changing over time. Decreases in infant mortality have been followed by decreasing mortality for adults coming from improvements in healthcare and the development of vaccines and antibiotics, and more recently, medical advances in fields such as cardiology which have impacted the mortality rates at older ages. As this acceleration of mortality improvement at older ages has only occurred more recently, the Lee-Carter model tends not to capture this shift of improvements, potentially underestimating the increase in life expectancy at these ages. In addition, the stochastic projections tend to result in rather narrow confidence levels making risk assessment at more extreme percentiles problematic.

Compared to the Lee-Carter model, the Cairns-Blake-Dowd model allows for a more complex correlation structure for improvements across different ages, which is arguably more realistic than a scenario of perfect correlation. The model was developed with the focus on providing reasonable mortality projections for older ages, which is also the focus of the analysis presented in this paper. However this model still tends to demonstrate a poorer fit compared with the other models.

The P-spline model is very good at smoothing out the noise in raw historical data; however, future projections can be rather unstable as they are very sensitive to the most recent years of input experience.

While the underlying modelling of the CMI model is extremely complex, the projected scenario is influenced by a long-term improvement assumption determined by the user, resulting in scenarios that both reflect recent experience in the short term but converge to a long-term scenario judged to be plausible by the user.

The assessment presented here relies on deterministic projections of all models. Although the term "longevity risk" is often used to imply a certain level of confidence, here longevity risk is considered to be the risk that the actual increase in longevity experienced in the future is greater than what has been assumed, regardless of the confidence level. Thus, if the deterministic scenarios of all models are predicting that future improvements will be greater than what is currently being assumed, a reasonable conclusion would be that the pension plan or annuity provider using these assumptions is exposed to this "longevity risk", synonymous with the probable shortfall of provisions which we attempt to quantify here.

Basis of the calculations and comparison

The projection models have been calibrated to the mortality of the overall population for each respective country, therefore the direct output of the projection models is the predicted future mortality for the overall population. However, the standard mortality tables used by pension funds and annuity providers typically intend to represent the mortality for subgroups of the total population.

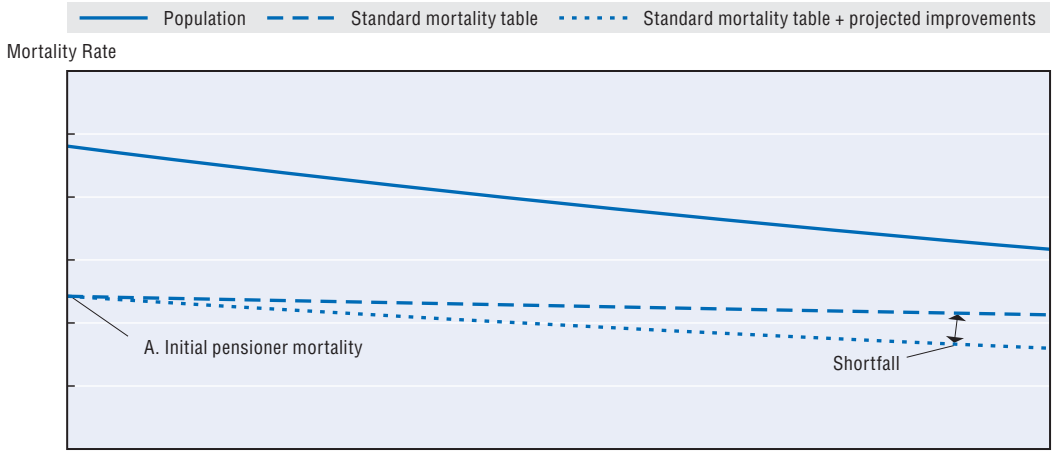
Pensioners and annuitants are subsets of the overall population who often have lower expected mortality (higher life expectancy) than the population in general. Pensioners, and even more so annuitants, tend to have a higher average income level (and/or have higher educational attainment levels) than the population as a whole. This has been shown to be positively correlated with longevity and life expectancy, and the mortality assumptions applied to these subpopulations reflect these differences (see Box 1.1). Indeed, the mortality tables used for pensioners and annuitants are typically established based on the mortality experience of these subsets. However the extent to which the mortality of these two populations differs depends largely on the structure and coverage of the pension system itself, as if the coverage rate is quite high the pensioner population will be largely similar to the overall population.

The life expectancy and annuity rates obtained from the standard mortality tables are therefore not directly comparable in most cases to the outputs of the models which give the life expectancy for the entire population. To the extent that the life expectancy given by the standard tables is lower than that predicted by the models it is possible to conclude that the standard tables likely do not account sufficiently for longevity, as we expect the inverse relationship, that is, for pensioners and annuitants to have a higher life expectancy. However, it is not possible to quantify the amount of longevity risk from this result.

In order to quantify the potential shortfall in provisions that pension funds and annuity providers may be facing, the population mortality coming from the models is adjusted proportionally to match the level of the pensioner/annuitant mortality based on the most recent mortality experience available for these populations (typically the experience on which the standard table was based). In this way, it is possible to compute a life expectancy predicted by the model which is comparable to that which is assumed in the standard mortality tables.

This approach is demonstrated in the figure below. The mortality rates for the general population which are output by the model are represented by the solid line. These mortality rates are adjusted downward – using the ratio of actual insured/pensioner mortality rates to population mortality rates – to the level of the pensioner mortality, point A in Figure 1.6. The annual rates of mortality improvement for the general population and the pensioner/annuitant population are assumed to be the same, so the difference in the mortality given by the standard table and that predicted by the model is then driven only by the differences in the assumed and modelled mortality improvements. The resulting shortfall is therefore coming from the gap between the two dashed lines, and includes the retrospective differences based on the evolution of actual historical mortality from the time of the development of the table to the current point in time, as well as differences in improvements projected into the future.

Figure 1.6. **Illustration of mortality adjustment for projections**



Source: Author's illustration.

However, the shortfall presented here could potentially be understated with this approach as a result of the underlying assumptions. The assumption that pensioners and annuitants follow the same pattern of mortality improvement as the general population is strong, and there has been some evidence presented showing that factors such as income which influence the lower mortality for pensioners and annuitants also impact the rate at which their mortality improves. A study on pensioners in Canada found significant differences in the mortality trend over the last 15 years for the highest income group, particularly for males aged 60-75, with differences surpassing even 1% of annual improvement for some age groups (Adam, 2012). Similarly, male annuitants aged 70 in Switzerland have experienced improvements of 2.4% as opposed to 1.3% for the general population (Pasolika, 2005). The difference for females was less obvious in these studies. Nevertheless it is difficult to say whether this divergence in mortality could continue in the long term, therefore the assumption of a common trend is considered to be a reasonable concession.

This analysis also relies on the assumption that the initial mortality established by the regulatory and industry mortality tables accurately reflected the mortality of the population for which the table is being used. This is clearly not always the case, particularly for example if the tables are based on a population in a different country. In

these cases an effort has been made to use an initial mortality which is the most representative of the best estimate mortality based on available data. Similarly, if the mortality table includes margins, these have generally been removed when calculating the life expectancies coming from the models so as to recognise the extra conservatism embedded in the tables when assessing the potential shortfall in funding.

The actual quantification of the shortfall in this exercise relies on the computation of the annuity values based on these two sets of mortality rates.[8] The annuity value represents the premium an individual would have to pay to receive one unit of currency per annum. It also represents the present value of the expected payments which the pension fund or annuity provider owes to the individual, and therefore can be seen as the amount that needs to be held in reserve in order to meet future payment obligations. The current funding and reserve requirements of pension funds and annuity providers are assumed to be based on the standard mortality tables.

Therefore, the ratio of the annuity value based on the mortality model outputs over the annuity value based on the mortality tables used by pension funds and annuity providers measures the potential shortfall in provisions to which they may be exposed.

Potential shortfall of provisions based on standard mortality tables[9]

The following analysis is based on the projections of the population mortality adjusted to the mortality level of the pensioners and annuitants by using the initial level of mortality established by the standard mortality tables and applying the mortality improvements given by the projection models.

Overall, pension plans face more longevity risk than annuity providers, who more often tend to include assumptions for future mortality improvement and whose tables tend to be more up to date. Six tables used for pension funds lead to a potential shortfall in provisioning for longevity risk of over 5%, whereas only two tables used by annuity providers lead to such results. In countries where different tables are used for pension funds and annuity providers, tables used by pension funds tend to be less adequate than those used by annuity providers in all cases except the United Kingdom, where both pension funds and annuity providers seem to sufficiently account for the future improvement in mortality, and Mexico, where projected mortality improvements tend to be relatively low. New tables which are meant to replace the older existing tables shown here clearly reduce the expected shortfall for Brazil (BR-EMS 2010 compared to US Annuity 2000), Canada (CPM compared to UP94) and the US (RP2014 compared to RP2000).[10] Of the tables for which little to no longevity risk was assessed, four are used by annuity providers whereas only two tables used by pension funds met the criteria.

The table below classifies the mortality tables used for pension plans and annuity providers in each country by the percentage of additional reserves which would be required based on the results of the projection models compared to the table.[11, 12, 13, 14]

None of the tables classified as having greater than a 10% shortfall in provisions take future mortality improvement into account. However the extent to which the EVK2000 table in **Switzerland** is used in practice is minimal, with fewer than 8% of pension funds relying on this table in 2012 and an increasing number of funds moving towards the more recent generational tables BVG 2010 and VZ 2010. Furthermore in practice the standard mortality tables in Switzerland are adjusted to the actual mortality experience of the

Table 1.4. **Classification of standard mortality tables by potential shortfall in provisions**

Classification	Potential Shortfall	Pension Plans	Annuity Providers
Serious	10-20%	Brazil (*US 1983IAM*), China (*CL2000-2003*), Switzerland (*EVK2000*)	Brazil (*US Annuity 2000*), China (*CL2000-2003*)
Significant	5-10%	Canada (*UP94-ScaleAA*), Japan (*EPI2005*), US (*RP2000-ScaleAA*)	
Moderate	2-5%	Chile (*RV2009*), Spain (*PERM/F C 2000*)	Brazil (*BR-EMS 2010*), Canada (*GAM94-CIA*), Chile (*RV2009*), Spain (*PERM/F C 2000*), US (*GAM94-ScaleAA*)
Monitor	< 2%; specific issues to address	Canada(*CPM*), France (*TGH/F 2005*), Israel*, Mexico (*EMSSA 1997*), Spain (*PERM/F P 2000*), Switzerland (*BVG 2010, VZ 2010*), US (*RP2000-ScaleBB*)	France (*TGH/F 2005*), Israel*, Mexico (*EMSSA 2009*), Japan (*SMT 2007*), Spain (*PERM/F P 2000*)
OK	little to no expected shortfall	Netherlands (*AG-Prognosetael 2010*), UK (*SAPS1-CMI*), UK (*SAPS2-CMI*), US (*RP2014*)	Germany (*DAV 2004 R*), Netherlands (*AG-Prognosetael 2010*), Switzerland (*ERM/F 2000*), UK (*PCMA/PCFA 2000-CMI*)

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
Source: Author's calculations.

pension fund itself, and the funds are required to ensure adequate reserves to meet future payment obligations.

For the tables classified as having a significant shortfall, some account for future improvements while some do not. While **Japanese** regulation permits occupational pension plans to take into account the future mortality improvements to the extent that the Employees' Pension Insurance Scheme does so in its actuarial valuation, in practice pension plans tend to not take them into account and the assessment for the EPI2005 table here therefore does not consider improvements. Although **Canada** and the **United States** do take improvements into account with the Scale AA, the assumptions are lower than the level that recent experience implies, resulting in a larger discrepancy between the results using the models and those coming from the tables. Furthermore, recent pensioner mortality studies in Canada show that life expectancy is higher than the United States experience on which the UP94 table was based.

Annuity providers in **Canada** and the **United States** use tables which result in a moderate expected shortfall in provisions, as mortality improvement assumptions are not entirely reflective of recent experience, and again the GAM94 table used by Canada is based on United States mortality experience, though this classification for Canada excludes the additional margins which are typically applied in practice. The assumptions used in **Chile** also incorporate mortality improvements, though these assumptions do not seem to reflect the most recent improvements in life expectancy of the population.[15] The table used by **Spain** for policies issued prior to 2000 is also classified at this level, whereas the more prudent table developed concurrently for policies issued later than 2000 has lower risk, though slightly more potential risk for males than females.

Besides these latter tables for Spain, the regulatory tables used in **France** and **Israel** also show little potential risk of an expected shortfall, though the assumptions should be closely monitored as the assumptions for females at high ages in France may be insufficient in light of recent experience, and recent improvements in Israel have been quite high even compared to the relatively prudent assumptions used. The newer generational tables used by pension funds in **Switzerland** (BVG 2010, VZ 2010) and the **United States** (Scale BB) are a significant improvement compared to the older tables used, though as neither of these newer assumptions are required it is not clear how widely these tables have been adopted for use. The assumptions used by **Japanese** annuity providers seem also to be sufficient on average, though attention should be paid to the demographic distribution of the populations for which these tables are used, as over-provisioning for longevity improvements for ages over 65 tends to compensate for the under-provisioning for younger ages. While the tables used in **Mexico** also seem to sufficiently provision for expected mortality improvements for now, recent improvements in mortality have been slowing and Mexico currently has rather low life expectancy compared to other OECD countries. Therefore the potential for longevity to accelerate in Mexico and life expectancy to catch up to other OECD countries exists, and mortality experience should be closely monitored for changing patterns to ensure that the tables remain adequate.

Tables used by pension funds in the **Netherlands** and the **United Kingdom** seem to sufficiently account for future improvements in mortality. Both of these tables were developed by actuarial associations in the respective countries, and while commonly used in practice, neither table is legally required. This also holds true for the tables used by annuity providers in these two countries. In **Germany** the tables are required by regulation. The recent US RP2014 table with the MP2014 improvement scale also shows little to no expected shortfall in provisions, and this table is expected to replace the older RP2000.

Brazil and **Canada**, the two countries using tables based on experience outside of their own country, have both recently developed mortality tables based on their own populations. While no mortality improvement assumptions have been incorporated into the new tables for **Brazil**, this update does significantly reduce the potential longevity risk to a moderate level. The potential shortfall in provisions also reduces for Canadian pensioners under the new CPM tables recently issued.

Several countries (**Canada**, **Israel**, **United Kingdom** and **United States**) have also developed specific mortality tables for pensioners or annuitants based on socio-economic factors such as income and employment type. The results of these tables clearly show that liabilities increase relative to the total pensioner or annuitant population for those with higher income levels and white collar employment. However, in all cases income matters more than the type of employment, and the impact for males is much more significant than for females. These results highlight the fact that attention should be paid to the demographic characteristics of the population for which standard mortality assumptions are being used, and should be adjusted accordingly if the population tends to be of a higher socio-economic level.

This analysis shows that the failure to account for future improvements in mortality can result in a shortfall of provisions of well over 10% of the pension and annuity liabilities. Likewise, the use of assumptions which are not reflective of recent improvements in

mortality can expose the pension plan or annuity providers to the need for a significant increase in reserves.

Improvements in mortality and in life expectancy are a phenomenon which cannot be ignored when setting mortality assumptions for the future. Mortality assumptions have a significant influence on the liability value for pension funds and annuities and realistic assumptions are necessary in order to sufficiently provision for future payment obligations and ensure the solvency of the providers.

Pension funds and annuity providers must actively assess and manage their longevity risk, keeping assumptions up-to-date and recognizing the risk to which they are exposed. Demand for protection against longevity risk will only increase as individuals expect to live longer, and the sustainability of pension funds and annuity providers providing this protection for individuals has to be ensured. Sufficient provisioning for longevity is essential to guarantee that future payments will be met, and the ability for providers to manage and mitigate this risk will allow continued protection to be offered in the future.

1.5. Managing longevity risk

Pension funds and annuity providers need to manage their longevity risk. Pension funds and annuity providers can manage longevity risk in-house as part of their internal risk management systems, for example, by retaining the risk and holding enough capital to withstand fluctuations.[16] This arrangement has traditionally been facilitated by the actuarial valuation process. Longevity risk can be measured by using appropriate models to estimate future improvements in mortality and life expectancy (e.g. stochastic models that allow probabilities to be calculated). In this context, the longevity risk will be the difference between the improvements in mortality and life expectancy assumed in the actuarial valuations and the actual improvements that occur in the future. Hence, the first step in managing longevity risk is to recognise that it exists and incorporate reasonable expectations regarding mortality improvements in mortality assumptions. Mortality and life tables should be updated regularly to support the process.

Insurers can to some extent reduce their aggregate longevity risk exposure by offering both life insurance and annuities. The liabilities of life insurance decrease as mortality improves while those of annuities increase. However, life insurance and annuity portfolios often cover different population groups, so this arrangement is not a perfect hedge and there is residual longevity exposure since annuities are concentrated among the older population groups.

One of the main issues faced by annuity providers is a capacity constraint in the amount of longevity risk they are able to accept and insure. This capacity constraint is largely driven by regulatory requirements surrounding the required capital which needs to be held and the increased focus on enterprise risk management. Therefore instruments need to be available to mitigate this risk if necessary.

Pension funds and annuity providers can mitigate longevity risk by transferring it to a third party. There are several solutions that allow pension funds or annuity providers to either transfer or hedge longevity risk with a third party. The first type is referred to as a bulk annuity, where both investment and longevity risk are transferred to the third party (usually (re)insurers), and can be done either as a buy-out or buy-in structure. The second type is via a longevity swap, a hedge which transfers only the longevity risk to the third party. Most of the transactions implemented in the market in the past years have been

based on fully transferring longevity risk from one party to another via buy-outs and buy-ins, and recently via bespoke longevity swaps based on the mortality of actual pensioners or annuitants. One of the main problems with these types of arrangements is the capacity constraints that (re)insurers face for the amount of longevity risk they are able to accept. Capital markets may have the potential to provide additional capacity if standardised instruments to hedge longevity risk via longevity bonds, swaps and other derivative contracts were available. For purposes of standardisation, these instruments may need to use longevity indices based on the general population.

Pension buy-outs and buy-ins

The most common arrangements for transferring longevity risk from pension funds in the private sector have up to now been pension buy-outs and buy-ins. Both of these solutions remove the longevity risk as well as investment risk from the pension fund or plan, transferring these risks to an insurer or reinsurer. These hedges usually cover only the current pensioners and are especially attractive for defined benefit pension plans in termination.

In a pension buy-out, the pension fund and/or plan sponsor hands over all the assets and liabilities of the fund to an external provider. After the conclusion of the contract, the responsibility for making payments to members passes to the provider (typically an insurer or reinsurer) and removes the pension liabilities from the sponsor's balance sheet. While the plan sponsor offloads all risk, this arrangement exposes plan members to counterparty risk, or the risk that the insurer becomes insolvent, as the structure no longer has the same benefit protection mechanisms in place as the pension plan.

In a pension buy-in, the pension fund or plan sponsor retains the liabilities and assets and remains responsible for the payment of pension benefits to members, but effectively insures these payments with an external provider. In exchange for a premium, the provider fully or partially insures the pension plan's liabilities. Thus, in effect, the pension fund buys an annuity contract with an insurance company so that annuity payments coincide with some or all the benefit payments of the pension plan.

While these types of arrangements maximize the risk transfer for the sponsor, both types of contracts tend to require significant upfront premiums, making them a less feasible solution for underfunded plans.

Longevity swaps

As an alternative to buy-ins and buy-outs, pension funds and annuity providers can retain the investment risk and pass only the longevity risk to a third party through the use of longevity hedges. These instruments can be structured as perfect hedges in bespoke transactions, or they can be based on an objective longevity index. Insurance and reinsurance companies are the usual counterparty in the case of bespoke longevity hedges, which are the most common form of transaction, but capital market solutions using index-based arrangements are also beginning to emerge in practice. Compared to bulk annuities, longevity derivatives can be a more economical solution to hedging longevity risk as they typically do not require large upfront premiums.

One of the more commonly used longevity derivatives is a longevity swap. In a longevity swap, the party seeking to hedge their longevity risk pays a series of fixed amounts for the duration of the contract ("fixed leg") based on pre-specified mortality or

survival rates in exchange for receiving a series of variable payments ("floating leg") which are linked to actual mortality experienced. The net payments are settled at regular intervals, and the fixed plus variable payments should track closely with the actual pension or annuity payments being made, thereby providing a hedge for the longevity risk of the pension fund or group of annuitants. Box 1.2 provides an example of the structure and payments for a bespoke longevity swap.

Box 1.2. **Hypothetical example of a longevity swap**

Consider a hypothetical example of a homogeneous pension plan with 100 000 members aged 65 years as of 1st January. Each month, the pension plan has to pay €10 to each member of the plan. The pension plan wants to hedge its exposure to longevity risk and enters the fixed side of the longevity swap based on survival rates with starting date of 1st January. The table below shows the cash flows for the first four months.

Assume that after one month, every pension plan member is still alive. Therefore, the pension plan has to pay €1 000 000 to the plan members, whereas the predefined cash flow is €950 000 as 5 000 pensioners were expected to die. Therefore, the pension plan has to pay more money to the members than expected, but it receives this extra money from the hedge provider. The amount received from the hedge provider is €50 000.

Assume that after the second month, 5 000 pension members have passed away and so the pension plan has to pay €950 000 to the surviving pensioners. However as only 93 000 pensioners were still expected to be alive, the pension plan receives €20 000 from the hedge provider, which is the difference between the actual payments made and the expected payments.

Assume that between the second and the third month, another 5 000 people pass away making the actual pension payment €900 000 compared to an expected €910 000 leading to fewer payments to the pensioners than planned for. Therefore, the pension plan has to pay €10 000 to the hedge provider.

Date	Actual Pension Payment	Predefined cash flow	Payment to the pension plan
Feb. 1st	1 000 000	950 000	50 000
March 1st	950 000	930 000	20 000
April 1st	900 000	910 000	-10 000
May 1st	900 000	890 000	10 000

Longevity bonds

A longevity bond is another example of an index-based longevity hedging instrument. These bonds have no principle repayment, but pay regular coupons which are linked to a longevity index typically based on the mortality experience of the general population. The coupon payments are proportional to the survival rate of the specified reference population. For example, if a longevity bond is based on the survival of a cohort of males aged 65 at the time of issuing the bond, the coupons payable in 10 years will depend on the proportion of 65-year-old males who survive to age 75. Purchasers of the bond will thus receive a higher coupon in the event that mortality improvements have been higher than expected. Box 1.3 shows an example of the structure and payments from a longevity bond.

Compared to longevity derivatives, longevity bonds require a much larger upfront investment from the hedger of longevity risk, and the longevity protection which they offer can be limited due to the coupons' reference of a very specific population of individuals which may not correspond well with the specific demographic profile of the pension plan or annuity portfolio being hedged.

Box 1.3. **Hypothetical example of a longevity bond**

The EIB/BNP bond attempt in 2004 had a 25-year maturity and coupons were linked to a cohort of English and Welsh males aged 65 in 2003, which entailed a potentially large basis risk for other populations. The initial coupon payment was £50 million. Let q(x,t) be the mortality rate of a person aged x in the year t. The survivor index S(t) was constructed as follows:

$S(0) = 1$

$S(1) = S(0) * (1 - q(65,2003))$

$S(2) = S(1) * (1 - q(66,2004))$

$S(t) = S(t-1) * (1 - q(64+t,2002+t))$

The coupon payment was calculated as £50 million • S(t) with t = 1, 2, …, 25 and the issue price was £540 million determined by projected coupons which were discounted at LIBOR minus 35 basis points. The projected coupons were based on survival rates calculated by the UK Government Actuary's Department.

A hypothetical scenario is assumed here in order to describe the coupon payments in the first three years. The table below shows a possible development of the mortality rates, where those for the cohort aged 65 in 2003 are in **bold** as they are needed for the calculation of the survivor index.

Age x\Year t	2003	2004	2005
65	**2.05%**	2.00%	1.95%
66	2.15%	**2.10%**	2.05%
67	2.25%	2.20%	**2.15%**

Thus, the coupon payment at time t = 1 is 48 975 000 = (1–.0205) • 50 000 000

All hypothetical coupon payments in the first three years can be found in the table below

Time	Mortality rate q(64+t,2002+t)	Survivor index S(t)	Coupon payment
t = 1	2.05%	97.95%	48 975 000
t = 2	2.10%	95.89%	47 945 000
t = 3	2.15%	93.83%	46 915 000

Until now, buy-in and buy-out transactions have been the preferred way to transfer the longevity risk of pension funds to a third party. Longevity swaps have been gaining in popularity in recent years, however, and the volume of swap transactions in the United Kingdom surpassed that of buy-ins and buy-outs in the United Kingdom in 2013 (Hymans

Robertson, 2014). The vast majority of these transactions have been bespoke, with floating payments based on the actual mortality of the pensioners.

While a few attempts at issuing a longevity bond have been made, none have yet been successful. Hedging longevity with a longevity bond would expose the pension fund or annuity provider to arguably more residual basis risk than a longevity swap, as the reference index on which the coupons is based has to be quite generic (e.g. the cohort of 65 year old males). In addition, hedging with a longevity bond requires a significant upfront investment, making it economically less attractive compared to a swap. Basis risk and the significant upfront capital required are two main reasons why longevity bonds have not yet attracted a sufficient number of investors to be issued.

Requirements for the development of capital market solutions for managing longevity risk

The development of capital market instruments for hedging longevity risk requires certain conditions to be met, namely relating to the increased standardisation, liquidity and transparency of longevity hedging instruments. The misalignment of incentives between the insurers and pension funds seeking protection from longevity risk and those of the capital markets investors need to be addressed. Appropriate legislation and regulation need to be in place so as to increase the understanding of the magnitude and significance of longevity risk. Finally, benchmarks could greatly facilitate the pricing and risk assessment of such instruments.

Addressing the misalignment of incentives through index-based longevity hedging instruments

Pension funds and insurance companies want to be guaranteed that they are fully protected against longevity risk and therefore have a preference for bespoke transactions based on the actual mortality of the underlying population being hedged, which is why these types of transactions have been by far the most popular. The traditional transaction involves the longevity risk being passed to an insurance or reinsurance company, as this type of risk forms a core part of their business and expertise. However, the trend towards risk based requirements and the increased emphasis on enterprise risk management will require increasing levels of capital to be held to cover the risk exposures faced and protect from the risk of insolvency, so the capacity for the insurance industry to absorb all of the demand for longevity protection is not endless. These capacity constraints therefore need to be addressed in order to ensure a supply of longevity protection sufficient to meet the needs of society.

Capital markets have the potential to provide the additional capacity for longevity risk and offer some relief from the concentration in the supply of longevity protection. One of the main incentives for capital markets investors to invest in longevity risk is that longevity is largely uncorrelated with typical market risks, and therefore could offer a diversifying investment opportunity.

However, bespoke transactions pose several problems for the capital markets investor. First of all is the lack of transparency of such a transaction, where the insurer or pension fund possesses asymmetrical information regarding the mortality experience of the population being hedged. Secondly, a bespoke transaction can be extremely time-consuming to implement as the investor must assess the specific longevity characteristics of the portfolio or fund in order to price the transaction. Finally the long-term nature of

longevity risk would expose the investor to a very long-tailed investment with a duration upwards of fifty years. These characteristics are not conducive to the creation of an attractive investment vehicle, for which cash flows would need to be based on an easily understood and independent measure, be transacted in a timely manner and reflect a duration more in line with the preferred investment strategy of the investor.

Index-based longevity hedges could address the above shortcomings and provide a potentially attractive investment for capital markets investors by increasing the standardization and transparency of longevity derivatives. Rather than payments being based on the actual underlying mortality of the plan or portfolio being hedged as in a bespoke transaction, an index-based transaction is based on the mortality of an independent mortality index, such as the mortality of the general population of the country. This structure would address the concerns of capital markets investors as cash flows would be based on an independent longevity index with clearly defined indicators, providing full transparency for the investor with respect to the calculation of payments. As cash flows would not be based on the mortality of the portfolio itself, the counterparty does not need to have any information about the portfolio and a transaction could be executed more quickly based on a standardized model. Finally there can be more flexibility around the design of the structure of the transaction so the duration of the instrument could be defined for a shorter time horizon and the tail risk limited.

Furthermore, as index-based hedges are much easier to standardise, they represent a more attractive investment vehicle for private investors since this standardisation makes index-based hedges more tradable in capital markets. This may lead to the development of secondary markets for longevity instruments, which would help increase liquidity and perhaps make the instruments less costly. These standardised instruments could then be more easily traded on exchanges.

Nevertheless, as opposed to a bespoke transaction, with an index-based hedge the pension fund or annuity provider would have to accept to be exposed to some remaining residual and tail risk, primarily that coming from basis risk. Basis risk exists as the mortality on which the index is based is not guaranteed to evolve in the same way as the mortality of the portfolio or fund being hedged, so there can be some discrepancy between the cash flows the hedger receives from the investors and the payments to be made to the pensioners.

This basis risk would be potentially larger for smaller plans or portfolios, which would be exposed to more idiosyncratic longevity risk – which is the risk that any specific individual will live longer than expected – and therefore are exposed to more volatility of mortality experience. This implies that index-based solutions may be less effective for a small group of lives where these individual differences are not sufficiently diversified as with a large pool of lives. Index-based transactions may be much more effective in transferring the systemic longevity risk, which comes from the overall shifts in longevity trends, for example as a result of medical advances or better diet, and cannot be diversified away by pooling risks. One solution to the challenge smaller plans and portfolios face in mitigating their longevity risk would be for an insurer or reinsurer act as an intermediary to the capital markets by providing bespoke hedges with these small plans to acquire and pool the risks, subsequently transferring the systemic longevity risk of this pool to the capital markets.

Legislation and regulation

It is vital to have a realistic and appropriate valuation of pension liabilities and to recognize the full potential impact of longevity risk in order for capital market solutions for hedging longevity risk to develop. In this context, up-to-date mortality tables as well as assumptions that include future mortality and life expectancy developments would help in recognising the amount of longevity risk.[17] Additionally, risk-based capital requirements could help in communicating the significance of longevity risk.

Longevity hedges benefit pension funds and annuity providers by reducing the risk they are exposed to. If risk management and mitigation were reflected in capital reserving requirements, pension funds and annuity providers would have more incentive to hedge their longevity risk. For instance, the Pension Act introduced in the United Kingdom in 2004 implied sufficient capital relief to make longevity transactions attractive, which is one reason why transactions to hedge longevity risk have become so prevalent in the United Kingdom. It is crucial that the regulatory framework allows for pension funds and annuity providers to reduce their capital requirements if they hedge their longevity risk to reflect the lower risk exposure compared to those who do not hedge their longevity risk.

Risk based capital requirements should lead to reductions in capital requirements when using instruments to reduce longevity risk exposure. This would be a step in the right direction for annuity providers to have incentives for using longevity hedging instruments. The underlying concept of "mark-to-market" valuation, i.e. valuation via market prices or, if no market prices are available, valuation according to market principles, should force annuity providers to assess their longevity risk on a realistic basis. In the case of mortality and longevity, this implies the use of "best estimate" mortality tables (company specific) in combination with a risk margin for uncertainty with respect to non-hedgeable risks. Once a deep and liquid longevity market has been developed, the mark-to-market valuation of longevity risk will be possible. Thus, a longevity market could also be very helpful in determining appropriate capital requirements.

In addition to capital requirements, accounting rules are crucial for a realistic assessment of longevity risk. In some countries, certain mortality tables and fixed interest rates are prescribed for the computation of pension liabilities. Pension funds are obliged to use these specifications, e.g. for tax reasons, even if they know that they are not realistic for their specific case. Here, discussions with the International Accounting Standards Board (IASB) and governments are necessary to ensure that mortality and interest rate assumptions are always up-to-date and that realistic values for pension liabilities are disclosed. When this has been achieved there is a better chance that pension funds and annuity providers will address their longevity risk and consider mitigating their risk, possibly via capital market transactions

Accounting rules and standards also need to allow for the accurate valuation of longevity hedging instruments. For example, improvements in mortality and life expectancy beyond those initially assumed may render longevity hedges more valuable than their purchase price which could offset the increase in liabilities resulting from higher life expectancy. Accounting rules which do not accurately value such instruments may make longevity hedges rather unattractive. For example, some countries do not allow insurance companies to value longevity instruments at a higher value than the purchase price. Thus, if longevity – and consequently the fair value of the hedging instrument –

increases, insurers will not be able to show the increased value of the longevity hedge on their statutory balance sheets to offset the increased value of the liabilities.

Another example where regulation may restrict the benefit which can be realized from a longevity hedge would be where policyholders are entitled to a certain part of an insurer's unrealized gains with each payment they receive. In this case, an increase in the fair value of a longevity hedge could only partly be used to offset an increase in liabilities as a portion of the increase would need to be distributed to policyholders.

Benchmarks to promote standardisation, liquidity and transparency

A capital market for financial instruments to hedge longevity risk requires standardisation, liquidity and transparency for its proper functioning. As discussed above, index-based instruments are much more conducive to these requirements than bespoke transactions.

As such, publicly available reference points for pricing index-based longevity transactions could be used by potential market participants to enter the market. Unfortunately, most longevity transactions carried out thus far have been bespoke over-the-counter deals whose pricing have not been made public, and therefore have not contributed to the standardisation and transparency of the market.

The issuance of index-based longevity bonds has often been discussed as a solution to kick-start the purchase of longevity risk by the capital markets by providing this standardization and transparency. A longevity bond would allow prices to become publicly available as a reference point for other transactions, establishing a riskless term structure which the private sector could use as a basis to issue index-based longevity derivatives. This term structure could also be used by regulators as a check for the appropriateness of the level of capital which the insurers are holding to cover longevity risk.

There are several arguments for the government issuance of a longevity bond. Compared to solutions offered by the private sector, such a bond would provide a longevity hedge with little to no counterparty risk which could increase the capital relief insurance companies could potentially receive from such a hedge. The government would also be better positioned to offer a hedge in line with the long duration of longevity risk, which capital markets investors have been so far reluctant to do. The government is also arguably in a better position to support the systemic longevity risk. Benefits for the government itself could include the reduction of its cost of borrowing compared to traditional government bonds since it would be receiving a risk premium for taking on the longevity risk. However, the longevity bond market is likely to remain fairly illiquid and the coupons would have to include a certain level of illiquidity premium, therefore it is not certain that the cost of borrowing could be reduced in reality (Brown and Orszag, 2006).

Nevertheless this solution would have to be very carefully assessed as many governments already hold significant longevity risk on their balance sheet from public pensions and health programs. Some commentators (Blake at al., 2010) argue that governments could hedge some of its exposure to increases in aggregate or systemic longevity through adjustments to the state pension. Governments are currently proving these types of adjustments – such as increasing retirement age or decreasing pension levels – are very slow to implement and face strong political resistance. However if insurance companies are not able to insure the longevity risk of individuals, it is possible that more elderly would fall into poverty and their longevity risk would have to be covered

by the government anyway through the safety nets which are in place. Therefore issuing longevity-indexed bonds could help to alleviate pressure on public finances in the long term.

A regular and reliable publication of a longevity index could also further the standardization and transparency. This index could provide a basis for the calculation of future swap payments as well as provide a price reference from which market participants could decide how much they are willing to pay for a given transaction. Such an index should include both metrics relating to current mortality as well as mortality projections which reflect the most up-to-date expectations of future mortality improvement and life expectancy. The methodology and data used to develop the index should be clear and transparent so that the market understands the basis of the calculations and will be confident in the reliability of the index going forward. As governments have access to all necessary data needed to publish such indices on an ongoing basis, perhaps national statistical institutes could be in charge of publishing annual indices for their respective countries.

1.6. Concluding remarks

The ageing of the population, particularly with respect to the continued increases in life expectancy, poses significant challenges to all types of pension plans. PAYG will face problems of sustainability, defined benefit schemes will need to ensure their continued solvency and defined contribution plans will have to consider ways to ensure an adequate income throughout retirement.

Policy needs to focus on implementing solutions to confront the fact that people are living longer lives to avoid undue financial burdens from the financing of retirement. Linking the age at which retirement benefits can begin to the changes in life expectancy would help ensure the sustainability of defined benefit and earnings based schemes in the future. However the way in which these two are linked needs to be carefully considered as mortality rates and life expectancy vary with socio-economic status. An alternative solution could be to link the number of contribution years to the life expectancy in a way which maintains a certain ratio of years in retirement relative to years contributing.

Pension and annuity providers which have promised a certain level of future income in retirement will need to make sure the mortality assumptions used for the valuation of their liabilities are adequate. If these assumptions are not in line with the expectations regarding the continued increase in life expectancy, the pension plan may not have sufficient assets to meet future payment obligations and runs the risk of insolvency. Regulation with respect to the mortality tables used, such as requiring the assumptions to be up-to-date and account for expected mortality improvement, could encourage pension plan and annuity providers to monitor their assumptions and assess their adequacy on a more regular basis.

The increased reliance on defined contribution pension arrangements has led to individuals running the risk of outliving their assets and not having an adequate retirement income throughout their retirement. In addition to encouraging increased pension savings for longer periods, protection from longevity risk should also be ensured through the purchase of annuity products for the payout phase which guarantee a certain level of income for life. However, the capacity for insurers to be able to continue to provide annuities to meet the need of longevity protection in society will have to be addressed.

While insurers can benefit to a certain extent from the diversification of longevity risk with the mortality risk coming from their life insurance business, this diversification is limited and they will face constraints in the amount of longevity risk they will be able to continue to accept.

Capital markets have the potential to offer additional capacity for longevity risk, but the transparency, standardization and liquidity of instruments to hedge longevity need to be facilitated. Index-based instruments address these issues by offering increased transparency and the ability to standardize the basic structure of longevity derivatives. However the regulatory framework will also need to reflect the reduction of risk exposure these instruments offer by ensuring they can be appropriately valued by accounting standards and lowering the level required capital for entities hedging their longevity risk. In addition, the issuance of a longevity bond or the publication of a longevity index to serve as a benchmark for the pricing and risk assessment of longevity hedges could greatly facilitate their eventual liquidity.

Ultimately, the ageing of the population and increasing life expectancy does not necessarily have to lead to significant negative financial consequences with respect to the financing of retirement. However the awareness and understanding of the dynamics of longevity risk needs to increase in order to implement appropriate solutions to address it, and the groundwork for these solutions needs to be laid soon in order to allow for a smooth transition to an older society.

Notes

1. *www.oecd.org/daf/fin/private-pensions/50582753.pdf*.
2. It is important to distinguish between the effective and the statutory retirement age. Increasing the statutory retirement age will only have a positive effect as long as it leads to an increase in the effective retirement age, which is generally lower. An increase in the effective retirement age even if the statutory retirement age remains unchanged will still help to partially offset the reduction in the workforce.
3. *The 2012 Ageing Report Economic and budgetary projections for the EU-27 Member States (2010-2060)* and *The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies* by the EcoFin presents the latest projections on the fiscal impact on ageing population and the underlying assumptions. The impact of ageing on pension expenditure from 2007 until 2060 ranges from -2.2 percentage points of GDP in Poland to 9.4 in Luxemburg with an average increase of 1.5 percentage points of GDP for EU27.
4. The OECD Working Party on Private Pensions has recently released a Roadmap for the Good Design of Retirement Saving Pension Plans that includes contributing and contributing for longer periods, as well as combining deferred annuities with programmed withdrawals as part of the 10 recommendations (*www.oecd.org/finance/privatepensions/designingfundedpensionplans.htm*).
5. See also the *OECD Roadmap for the Good Design of Retirement Saving Plans*. Lump-sums withdrawals are when individuals withdraw a large portion of their accumulated assets immediately, whereas programmed withdrawals are regular withdrawals of a certain percentage of the accumulated assets in their accounts. Lump-sums withdrawals should be limited to avoid running out of money in retirement.
6. Mortality and life expectancy are two sides of the same coin. Decreasing mortality rates directly imply that people are living longer on average, and therefore that life expectancy is increasing.
7. The study assesses fifteen countries: Brazil, Canada, Chile, China, France, Germany, Israel, Korea, Japan, Mexico, the Netherlands, Spain, Switzerland, the United States and the United Kingdom.
8. Annuity values are calculated with a discount rate of 4.5%.
9. All calculations were made as at 2010, with the exception of the UK tables and the Swiss VZ2010 table for which calculations were as at 2012.

10. The SAPS2 table will replace the SAPS1 in the United Kingdom, and the United States RP-2014 table was not yet officially released for use at the time of analysis.

11. The tables used by German pension funds (Heubeck 2005 G) were not available so could not be assessed.

12. The results shown in the table list the country and the name of the standard mortality table used in the following format: **Country (*Standard Mortality Table Name*)**.

13. The quantification here is based on the present value of whole life annuities discounted at 4.5%. However, one needs to bear in mind that the discount rate used to value liabilities differs across countries. For the sake of the comparability and in order to isolate the impact of changes in mortality, the analysis herein assumes a common discount rate of 4.5%. Nevertheless it should be kept in mind that the valuation of liabilities is highly sensitive to changes in discount rates, and the underlying longevity risk is exacerbated in scenarios of low interest rates. In this context, we could expect that if the current scenario of low interest rates remains (*IMF World Economic Outlook*, Spring 2014, Chapter 3) the potential shortfall shown here would be underestimated.

14. The expected shortfall could not be reasonably assessed for Korea as the margins included in the table could not be determined, though given the high level of life expectancy assumed by the standard table, the 6th EMT, it would be classified as having little to no expected shortfall.

15. Chile is planning to update their mortality table in 2016, at which point they plan to set mortality improvement assumptions to be more in line with observed historical experience and the results presented here.

16. In the case of pension funds, there are additional sources of protection beyond the pension fund's own reserves. First, additional contributions can be made by sponsoring employers and plan members to cover a situation of underfunding. Second, the pension fund can have a residual claim on the plan sponsor's assets or access to a guarantee arrangement in case of sponsor insolvency. Third, benefits may be adjusted and renegotiated. These risk sharing features of pension funds vary across countries, but are generally distinct.

17. An example would be the use of stochastic modelling of mortality and life expectancy.

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Chapter 2

Post-crisis pension reforms*

The 2012 edition of Pensions Outlook examined pension reforms from September 2007 to February 2012. During that period, in the aftermath of a major economic crisis, the main policy initiatives included increasing both the financial sustainability of public pensions and the security of private pensions. This chapter sets out the main pension reforms in the 34 OECD countries between February 2012 and September 2014. More than five years after the onset of the crisis, the world economy is still weak. Countries are accelerating the pace of pension reforms in order to stabilise both unsustainable government debt and public pension expenditure while addressing adequacy concerns in ageing societies.

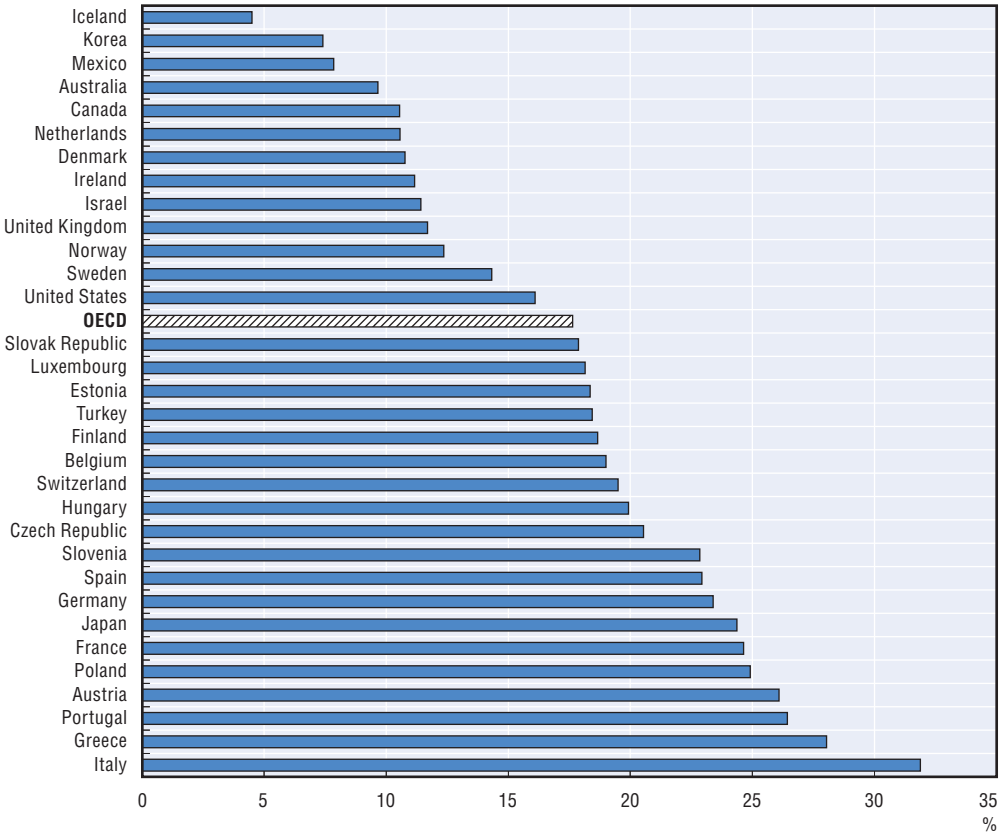
* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

2.1. Introduction

Pension systems differ substantially across OECD countries, but face the same main difficulty: remaining financially sustainable while delivering adequate pension income. Population ageing, driven by increasing longevity and low fertility, poses a persistent long-term challenge. Indeed, pension expenditure is forecast to increase in most OECD countries due to the rising share of older people in the total population, and annual retirement income could be negatively affected by greater longevity. In 2011, public pension expenditure as a share of total government expenditure averaged 18%, ranging from just below 5% in Iceland to almost 32% in Italy (Figure 2.1). The current need to reduce government debt to more sustainable levels and the already high level of public pension expenditure, including survivors' schemes, in many OECD countries imply that additional pension reforms are likely to figure prominently on the policy agenda.

Figure 2.1. **Public expenditure on old-age and survivors pensions, 2011**

Percentage of total government expenditure



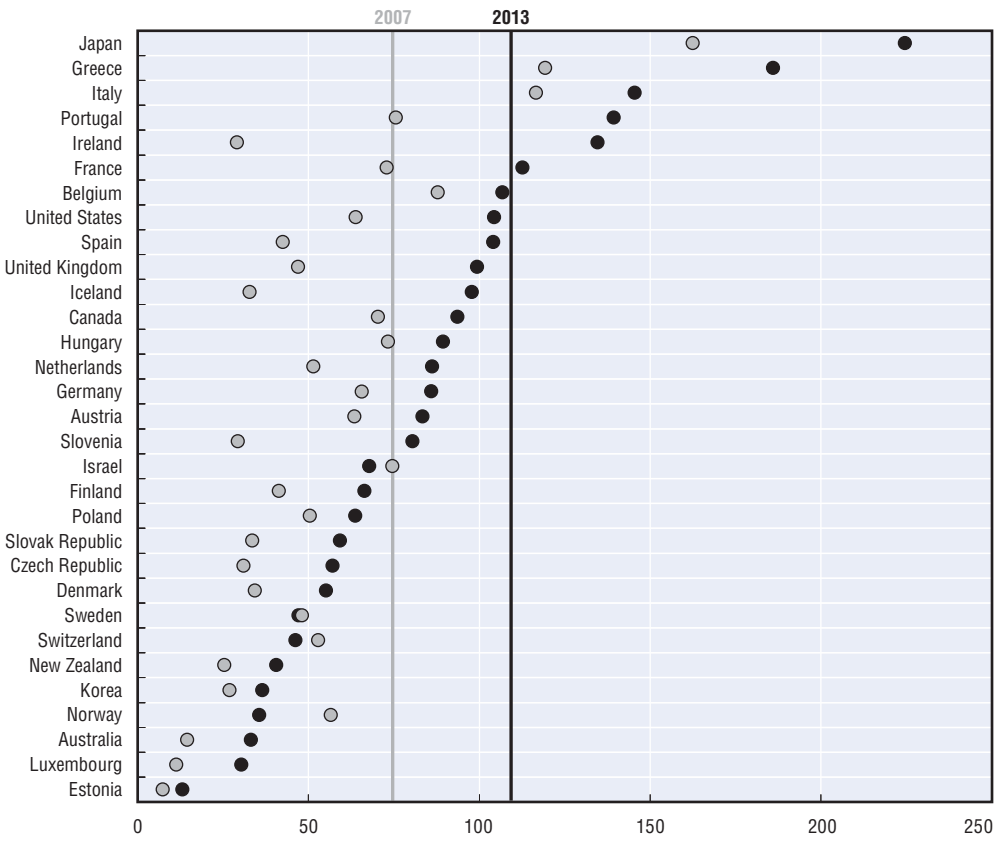
Source: OECD Social Expenditures Database (SOCX).

StatLink http://dx.doi.org/10.1787/888933156761

The economic crisis developed into a fiscal crisis in many OECD countries. In 2006 and 2007, budget deficits were 1.5% of GDP on average in the OECD (OECD 2014a). Since then public deficits have increased substantially and at times reached double digits in some countries, such as Greece, Iceland, Ireland, Portugal, Spain, the United Kingdom and the United States. In 2013, the OECD average general government deficit was 4.6% of GDP (OECD 2014a). Government debt levels increased from 73% of GDP in 2007 on average to almost 110% in 2013, as a result of reduced tax revenues due to unemployment and inactivity, the cost of interventions to support the financial system and other increases in public spending (Figure 2.2).

The severe macroeconomic difficulties have accelerated pension reforms and led to substantial changes in the pension landscape (see below). In some cases, however, these reforms were driven by the short-term need for fiscal consolidation rather than by a long-term prospect for the design of pension systems. This applies in particular to recent cases where assets in funded pension systems were transferred to general public accounts.

Figure 2.2. **General government debt in 2007 and 2013 (pre and post crisis)**



Note: Gross debt data are not always comparable across countries due to different definitions or treatment of debt components.

Source: OECD (2014), *OECD Economic Outlook*, *Vol. 2014/1*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eco_outlook-v2014-1-en*.

StatLink *http://dx.doi.org/10.1787/888933156776*

This chapter reviews and analyses the pension measures taken between February 2012 and September 2014. Its key findings are summarised below. The chapter is structured as

follows. Section 2.2 presents the main objectives of recent pension reforms along with a short overview of their possible effect on financial sustainability and retirement-income adequacy. Section 2.3 analyses the measures taken to improve adequacy through interventions in different areas: coverage; diversification and security; taxation; pension benefits; indexation; and administrative efficiency. Section 2.4 discusses pension reforms improving financial sustainability through policy actions affecting: diversification and security; taxation and contributions; pension benefits; indexation; work incentives; and administrative efficiency. Section 2.5 briefly describes other reforms covering a mix of policy measures that may be too specific to fit into those previously discussed. Finally, Section 2.6 concludes by discussing the key remaining challenges facing pension systems.

Key findings

Most OECD countries have been very active in changing their pension system over the last two and a half years. Given widespread fiscal consolidation needs, a majority of countries implemented reforms to improve the financial sustainability of their pension systems. Some countries have done so while maintaining or improving the retirement-income adequacy for vulnerable groups.

Financial sustainability

- Only a few countries, those worst hit by the economic crisis, resorted to nominal benefit cuts.
- A much larger proportion of OECD countries increased taxes on pension income or contributions to public defined benefit schemes.
- Reducing or deferring the indexation of pension benefits was widely used to mitigate spending.
- Many countries increased the statutory retirement age, thereby enlarging the contribution base while preserving adequacy for those effectively working longer.
- Work incentives were strengthened by tighter access to early-retirement and/or increased financial incentives to work. In contrast, some countries have instead lowered the retirement age for workers with long careers, encouraging labour market exit at an early age.
- Measures to curb pension administration costs and to increase value for money were also quite common.

Income adequacy

- Increasing the coverage of pension benefits, including by the mandatory extension of the system to previously excluded group (such as self-employed workers) has been a significant policy measure in a number of countries. Some countries have also introduced new benefits. Many countries extended working lives as a way to build higher pension entitlements and address adequacy concerns.
- Policies to increase diversification and secure private pensions savings have also been common in the aftermath of the financial crisis.
- A number of countries increased mandatory contributions to funded defined contribution schemes.

2.2. Objectives and overview of reforms

Nearly all OECD countries were active in changing their retirement-income provision systems between February 2012 and September 2014. In this chapter, the reforms are mostly related to the objectives of increasing retirement-income adequacy and improving financial sustainability. An overview of the expected effect of reforms on adequacy and on financial sustainability, and of their assessed impact and scope is presented in Table 2.1. All reforms are graded from negative (-), unclear (blank) to positive (+). The assessed scope ranges from narrow, medium to broad. A narrow reform affects only a small number of people while a broad reform affects a large proportion of the population. The impact assessment ranges from minor, moderate to major, depending on the expected quantitative impact on targeted people.

This framework illustrates the key trade-off of ensuring adequate benefits within a financially sustainable pension system. For example, changes in adequacy in a system in which there is a weak link between contributions and benefits, such as ad-hoc cuts or increases in benefits, will affect financial balances. If public pensions are at risk of being inadequate, there will be pressure to raise benefits to prevent old-age poverty. Similarly, too generous pension benefits could make the system financially unsustainable.

In other cases, there are synergies between increasing adequacy and improving sustainability. For example, working more and longer can increase adequacy as individuals can earn higher annual pension benefits and at the same time strengthen financial sustainability by collecting more contributions to the system. This is appealing when effective retirement age is low, especially given increasing longevity prospects, and requires that both employees and employers adapt their behaviour in order to effectively lengthen working lives and maintain adequate incomes over retirement. Otherwise this might negatively impact retirement income adequacy (see for example OECD, 2006). However, the countries that achieve a double plus in the Table below took a combination of measures, such as increasing contributions in defined contribution schemes and raising retirement ages or cutting pathways to early retirement.

During the period analysed, nearly all OECD countries made some adjustments to their retirement-income systems. The only country which did not make any change is Iceland. In 21 OECD countries the focus has been on changes related to increasing the financial sustainability of their pension system often through a longer working life. Improving income adequacy was also common as 17 OECD countries introduced measures that could be regarded as improving adequacy. In 20 countries the scope of the reforms is expected to be broad, i.e. to affect a large proportion of people. The overall impact assessment is more balanced. In 6 OECD countries it is regarded as major whereas it is assessed as moderate in 15 countries and minor in 12.

The overview of the pension reforms builds on measures described in greater detail in Table 2.A1.1 shown in Annex 2.A1. All reforms are classified in eight different categories: coverage, diversification and security, pension benefits, taxes, indexation, work incentives, administrative efficiency and a residual group of other reforms. The grouping corresponds to the main objectives and principles of retirement-income systems.

Table 2.1. **Overview of pension measures, February 2012-September 2014**

Countries:	Income adequacy	Financial sustainability	Impact	Scope
Australia	+	+	*major*	*broad*
Austria	+	+	*moderate*	*medium*
Belgium		+	*minor*	*medium*
Canada	+	+	*moderate*	*broad*
Chile	+		*minor*	*narrow*
Czech Republic	-/+	+	*minor*	*broad*
Denmark		+	*minor*	*narrow*
Estonia	+	-	*minor*	*narrow*
Finland	-	+	*moderate*	*broad*
France	+/-	+	*moderate*	*broad*
Germany	+	-	*moderate*	*medium*
Greece	-	+	*major*	*broad*
Hungary		+	*major*	*broad*
Iceland				
Ireland		+	*moderate*	*broad*
Israel	+		*major*	*broad*
Italy	-	+	*major*	*broad*
Japan	+/-	-/+	*moderate*	*medium*
Korea	+	-	*major*	*broad*
Luxembourg	+/-	+	*moderate*	*broad*
Mexico			*minor*	*narrow*
Netherlands		+	*moderate*	*broad*
New Zealand	+		*minor*	*broad*
Norway			*minor*	*medium*
Poland		+	*moderate*	*broad*
Portugal	-	+	*major*	*broad*
Slovak Republic	-	+	*moderate*	*broad*
Slovenia		+	*moderate*	*broad*
Spain	-	+	*moderate*	*broad*
Sweden	+		*minor*	*medium*
Switzerland	+		*minor*	*narrow*
Turkey			*minor*	*narrow*
United Kingdom	+	+/-	*moderate*	*broad*
United States	+		*minor*	*medium*

Note: See Annex 2.A1 for the details of pension reforms.

StatLink http://dx.doi.org/10.1787/888933156789

2.3. Increasing retirement-income adequacy

Adequacy may have deteriorated in some countries due to the tightening of benefits as part of fiscal consolidation programs. Reforms which strengthen the financial sustainability of the pension system are considered in the next section. They can have serious consequences for the living standards of the elderly, and could be especially painful if the cuts of retirement benefits are made from an already low level.

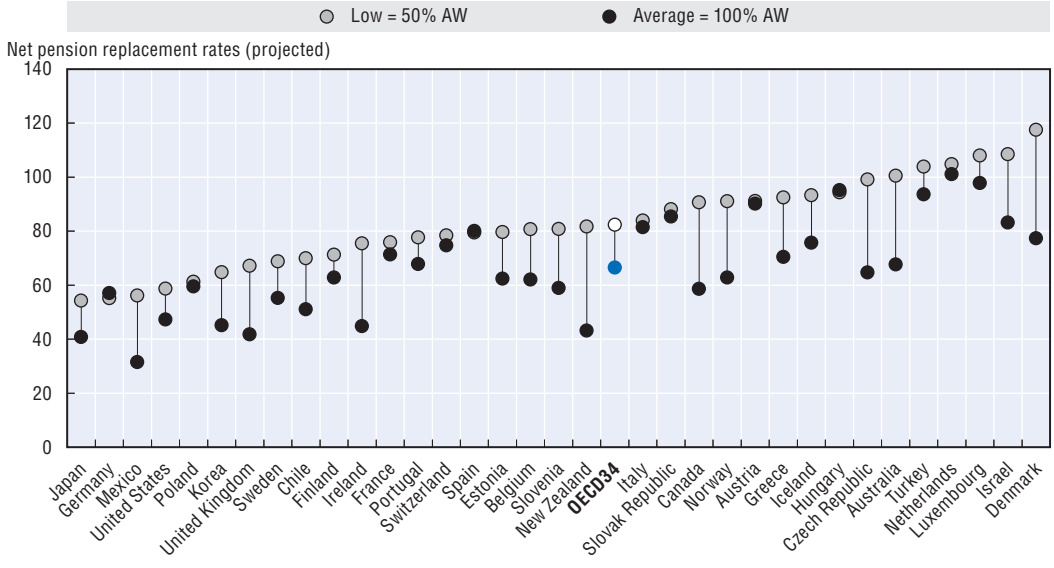
Reforms to improve the adequacy of retirement incomes include increasing coverage or benefit levels or both. However, defining adequacy is a difficult task. What constitutes an adequate pension might depend on citizens' political preferences and social ambitions. The assessment of a policy action in terms of adequacy can therefore depend on the definition and the indicators used. Most legislated or implemented changes entail redistributing resources from one socio-economic group to another (or from one generation to another): it can increase the adequacy of the latter at the expense of the

former. Generally speaking, retirement-income adequacy tends to increase when higher contributions are paid into the system or when contributions are paid for a longer duration. This is especially true in defined-contribution-type schemes where there is a direct link between contributions paid and benefits received.

The so-called replacement rate is one measure of adequacy (for a comprehensive overview of all OECD pension entitlement indicators and the assumptions underlying their estimation, see OECD, 2013a). Figure 2.3 shows theoretical net pension replacement rates for a full-career worker entering the labour market at age 20 in 2012 either at low or average earnings. The net replacement rate is equal to the ratio of the net pension entitlement to pre-retirement earnings after taxes and social contributions. Theoretical replacement rates are forward-looking and assume that legislated pension rules apply throughout an individual's career until reaching the normal pensionable age in each country. Pensionable age is defined here as the age at which individuals can first withdraw their full pension benefits, i.e. without actuarial reductions or penalties.

Countries with the highest net pension replacement rates for low-income earners are Denmark, Israel, Luxembourg, the Netherlands, Turkey, Australia and the Czech Republic (Figure 2.3). In Japan, Germany, Mexico, the United States and Poland, net replacement rates for low-income earners, at about 55-60%, are well below the OECD average, which is equal to 82%. Average income earners generally have lower net replacement rates than low-income earners due to the progressivity of the tax-pension benefit systems that is in place in most OECD countries. The OECD average for net replacement rates for average-income earners is equal to 67%.

Figure 2.3. **Theoretical long-term net replacement rates**



Note: The net replacement rate is calculated assuming labour market entry at age 20 in 2012 and a working life equal to the pensionable age in each country The net replacement rates shown are calculated for an individual with 100% and 50% of average worker earnings (AW).

Source: OECD Pension Models; OECD (2013), *Pensions at a Glance 2013: OECD and G20 indicators*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/pension_glance-2013-en*.

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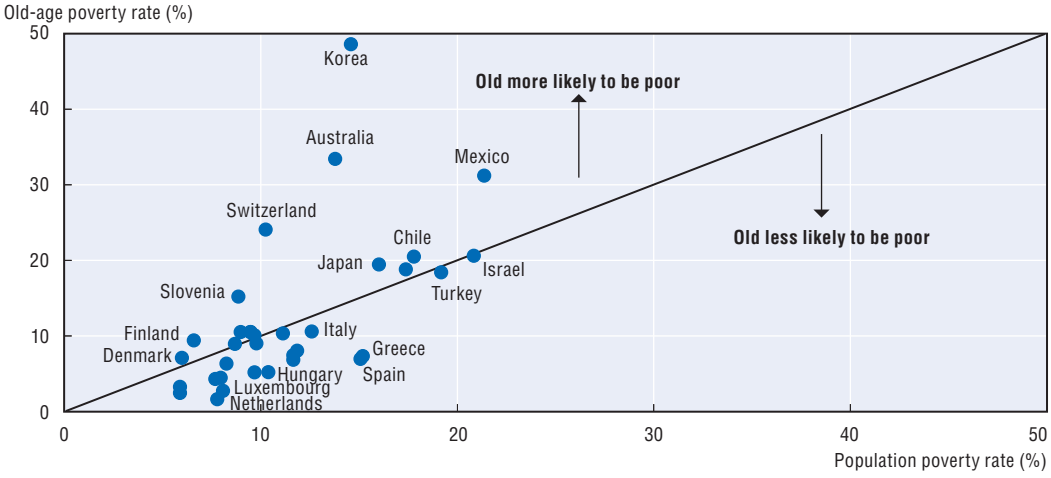
Adequacy may also be assessed by looking at the relative old-age income poverty rate. It is defined as the share of people with income below 50% of the median equivalised household income.[1] On average 12.3% of the population aged over 65 lived in relative income poverty in OECD countries in 2011, which is slightly above the 11.5% observed for the entire population (Figure 2.4). In countries such as Australia, Korea, Mexico, Slovenia and Switzerland, elderly people seem to be at a much higher risk of poverty than the rest of the population, whereas in Hungary, Greece, Luxembourg, the Netherlands and Spain older people seem to be much less likely to be poor.[2] The risk of poverty has over time generally shifted away from the elderly, and currently the young tend to face higher income poverty rates (OECD 2014b). Indeed, since the onset of the crisis, the youngest age group (18 to 25) has suffered the most severe income losses, while elderly people (over 65) have been largely shielded. In countries such as Greece and Spain this has translated into falling relative income old-age poverty rates.

Figure 2.4. **Relative income poverty among people over 65 and for the total population, 2011**



Note: See the Annex 2.A2 for numbers and names for all countries.
Source: OECD Income Distribution Database; OECD (2014), "Income Inequality Update – June 2014", OECD Publishing, Paris, *www.oecd.org/els/soc/OECD2014-Income-Inequality-Update.pdf*.

StatLink http://dx.doi.org/10.1787/888933156805

Coverage

Ensuring adequate population coverage by retirement schemes is a significant policy concern in a number of OECD countries, as it is perceived as an important way to fight income-poverty in old age. All OECD countries have set up mandatory or quasi-mandatory pension systems in order to achieve high coverage in public and/or private pension schemes. Countries with a large informal sector (such as Mexico) may have lower coverage levels even in mandatory schemes (see OECD, 2014d).

Following reforms over the last two decades in many OECD countries, voluntary private pensions are increasingly becoming an important complement to public pensions as replacement rates from the latter are often expected to decrease. As a result, obtaining adequate coverage levels in private schemes is a policy objective which is attracting more and more attention. Canada, Ireland, the United Kingdom and the United States have had the longest tradition of complementing public pensions with voluntary private pensions.

Since 2012, a number of OECD countries have introduced reforms to extend the coverage of pension benefits to groups previously not covered by mandatory or quasi-mandatory pension entitlements. Others have introduced new benefits. For all these groups, such measures will lead to higher retirement incomes. In France, the accrual of pension entitlements during periods of maternity, professional training, students' education and unemployment will become more generous, hence increasing coverage and pension benefits. Similarly, in Estonia a new supplement for child caring up to the age of three will increase future pension benefits. In Germany, the introduction of credits for child caring before 1992 (i.e. the mothers' pension) will increase current and future pension benefits retroactively. In Japan, from October 2015 the qualifying period for the national pension will decrease from 25 years to 10 years hence benefiting short–career workers. In addition, the employees' pension insurance will be extended to cover more part-time workers from October 2016. A new basic pension was introduced in Korea in July 2014. The measure benefits around 4 million. i.e. two thirds of all pensioners in a move to create a more universal pension benefit structure. In Mexico, the coverage of the Pension para adultos mayores, a targeted scheme for individuals with no or low pension income, was extended to cover all people aged 65 and above and non-Mexicans who have resided in Mexico for at least 25 years.

In the past two and a half years, some countries offered saving incentives (matched contributions, subsidies, tax deductions or credits) to increase coverage in voluntary private pensions, even though current budget pressures limit the room for manoeuver in this area. Other countries focused on non-financial incentives, including auto-enrolment and mandatory pension savings. Chile introduced in 2012 an auto-enrolment scheme for the self-employed which will become mandatory in 2015. In the United Kingdom, auto-enrolment in a workplace pension scheme is being introduced gradually depending on the size of the employer. A similar reform introducing an occupational pension scheme (MySaver) for uncovered workers is planned in Ireland and will be implemented once the economic conditions become more favourable. In Turkey, as of 2013, the government introduced matched contributions. In Luxembourg, access to voluntary private insurance will be easier for low-income earners as the minimal monthly contribution for voluntary insurance dropped from EUR 300 to EUR 100 starting in 2013.

Some countries also introduced new schemes in order to encourage participation and savings in voluntary private pension plans. Austria introduced two new types of benefits for defined contribution plans having supplemented the public pension system since 2013. A new retirement savings plan (the Pooled Registered Pension Plan) is also being introduced in sectors governed by federal legislation in Canada and in some provinces, and others provinces are expected to follow. This new plan, which is voluntary for employers except in Quebec and based on auto-enrolment of employees, is meant to address low workplace pension coverage, increase portability, reduce fees and lower employers' investment risks. In the Czech Republic, a second pillar of voluntary individual accounts is effective since 2013.

In countries like Australia and Switzerland, coverage of private pension plans amongst the elderly will rise, as the age limits for the payments of pension contributions were increased. These measures will also encourage workers to prolong their working lives. More specifically, in Australia, coverage and pension benefits will increase for workers aged 70 and above with the abolition of the age limit on compulsory contributions made to

private insurance. In Switzerland, coverage will be extended, as workers are allowed to pay contributions until the age of 70 against 65 before the reform.

Diversification and security

Policies to diversify and secure private savings have taken two main forms: i) improving investment options for funded schemes and increasing competition amongst funds; and ii) improving the governance of pension funds and the security of investments.

Some countries have focused their effort on increasing investor's choice. In Norway, the occupation pension plans are allowed more flexibility in their system design to better complement the new public notional accounts system, hence resulting in greater choice for individuals. In the Slovak Republic, three fund types were introduced to enable matching investment with risk preferences. In the United Kingdom, new rules for defined contribution pension withdrawals were legislated in May 2014 and will enable large lump-sum withdrawals. While this measure might increase pensioners' control over their accumulated funds, it could be detrimental to both retirement-income adequacy and incentives to work, due to individuals' myopic behaviour and insufficient financial literacy. The overall outcome depends on how successful individuals are in assessing their needs over their remaining life expectancy. In any case, such withdrawals bear risk that retirees outlive their savings, especially those with low wealth.

Other countries chose to improve the security of investment in funded pension schemes. These measures can consist in improving the governance and risk management of pension plans or in reducing individuals' investment risks. In Finland, the solvency regulations of the mandatory earnings-related pension schemes were modernised to rationalise risk-control. In Ireland, major changes were implemented to increase the overall security of private pensions. They involve a new benefit security in case of company bankruptcy, the re-establishing of a defined-benefit funding standard to protect benefits against volatility in the financial markets, increased risk reserves and stricter reporting of actuarial reserves. A law to improve the governance of occupational pension plans was also passed in the Netherlands. In Mexico, the pension funds (SIEFOREs) within the individual accounts system have introduced age-dependent limits on fund investments in equities. In the Slovak Republic, a rate-of-return guarantee was introduced for the low-risk investment option.

Pension benefits

Increasing the pension benefit of current retirees is the most direct way to address adequacy concerns. Existing benefits can be increased or new ones can be introduced.[3] During the crisis and the ongoing recovery, a number of countries have introduced ad-hoc increases in pension benefits targeting vulnerable groups. There were upgrades in targeted household benefits in Ireland. Low-income old-age pensioners will be provided with welfare benefits in Japan from October 2015. The basic pension will begin to increase in Luxembourg as of October 2012.

Over the course of a working life, individuals might experience voluntary or involuntary career breaks. Such breaks can affect the accrual of pension benefits and therefore be detrimental to pension benefit levels, and, in some cases, to incentives to work longer. In order to mitigate the effects of career breaks some countries have chosen to ease the rules on how past contributions on low income are accounted for in the pension benefit formula. In Canada, past earnings are ranked in descending order and the lowest

earnings months are dropped from the pension benefit calculation. The number of months which can be disregarded was also increased. In Japan, workers will be able to make up gaps in their contribution record by paying additional voluntary contributions. In both countries, these measures will increase benefits.

It is also possible to increase future benefits adequacy through increases in current contribution rates in defined contribution schemes. In New Zealand, the minimum contribution rate increased from 2% to 3% in April 2013. In Israel, the employees' contribution in mandatory defined contribution occupational pension plan was doubled to 5% and the employers' contribution was quadrupled to 10% in 2013, hence increasing future pensions considerably. In the United Kingdom, the contribution rate will increase between 2017 and 2018 from 1% to 3% for employers and from 1% to 5% for employees (including 0.2% to 1% of tax relief). Also, from 2016, a new state pension (single-tier pension, STP) will replace, although at a higher level, both the basic pension and the minimum income guarantee (Pension Credit).

Taxation

The tax and social contribution system plays an important role for net retirement income. Given the progressivity of income tax systems and the fact that pension income is generally lower than income from work, effective tax rates on retirement income tend to be lower. Moreover, most tax systems give preferred treatment to either pension income or pensioners, thereby addressing adequacy concerns, however at the cost of creating tax distortions. This sub-section addresses the income tax reforms undertaken to improve adequacy (rather than those aiming at increasing government revenues), including through tax incentives to contribute more.

A number of OECD countries have improved net retirement incomes by reducing total taxes and social contributions paid by pensioners. Tax relief was given to older people in Sweden and the United States. In Japan, women on maternity leave are exempt from employees' pension contributions since April 2014. In Mexico, pension income up to 25 times the minimum wage is now tax exempt. New tax incentives for private voluntary pension have been very rare and only Poland introduced a new tax incentive for voluntary personal plans.

Indexation

Most OECD countries adjust pension levels to protect pensioners against changes in the cost of living or in relative income by indexing benefits to prices, wages or a combination of both (see e.g. Whitehouse 2009). The longer retirement lasts the more important indexation becomes for adequacy. While a number of OECD countries had increased pension indexation in previous years, few countries have taken such measures since February 2012. Pension benefits will increase in Japan as the ad-hoc nominal freeze in the value of pension benefits will be eliminated in 2015. Since the last OECD Pensions Outlook many countries changed the indexation of pension benefits mainly in order to improve financial sustainability rather than to address adequacy concerns (see in Section 2.4).

Administrative efficiency

There is a clear trade-off between increasing flexibility and choice in these plans to meet the needs of different workers at differing stages, and minimising both fees and risk.

In any case, high fees discourage workers from joining voluntary plans and make mandatory plans too costly. Cost inefficiencies could threaten not only sustainability and adequacy, but also the legitimacy of pension plans. In private defined-contribution schemes higher administration costs lead to lower pension benefits, thus reducing adequacy. In public pay-as-you-go defined benefit schemes, the connection is not as clear as the administration costs tend to be borne by taxpayers. In these cases, reforms to mitigate administration costs are discussed within the financial sustainability part. This section follows up on reforms that aim to reduce costs directly or to increase competition through the disclosure of costs, fees and performance.

Reducing fees in defined contributions schemes has been a key objective for many regulators. In Chile, Planvital, one of the six private pension fund administrators, won the tender to manage defined contribution accounts for new entrants; the new fee will be 0.47% on account holder's monthly earnings, compared to 0.77% previously. In Australia, a new simple defined contribution scheme (MySuper) will cover new employer-nominated pension funds (default contributions) from 1 January 2014, and will offer a more uniform, easier to compare set of products. All pre-existing employer-nominated default fund balances will be transferred into a MySuper account by 1 July 2017. In the United Kingdom, the new National Employment Savings Trust (NEST) scheme will create economies of scale and hopefully lower administration costs. The NEST currently runs with charges amounting to 0.3% of assets and 1.8% of contributions.

Better information disclosure and data collection can improve the efficiency of a pension system. Standardised pensions accounts in Austria will increase both transparency and the understanding by pensioners of their entitlements. In an attempt to increase competition and public awareness in New Zealand, providers of the government-subsidised voluntary retirement saving scheme (the so-called "Kiwisaver") are required to post on their websites information regarding fund performance, fees, returns, portfolio and key staff information on a quarterly basis.

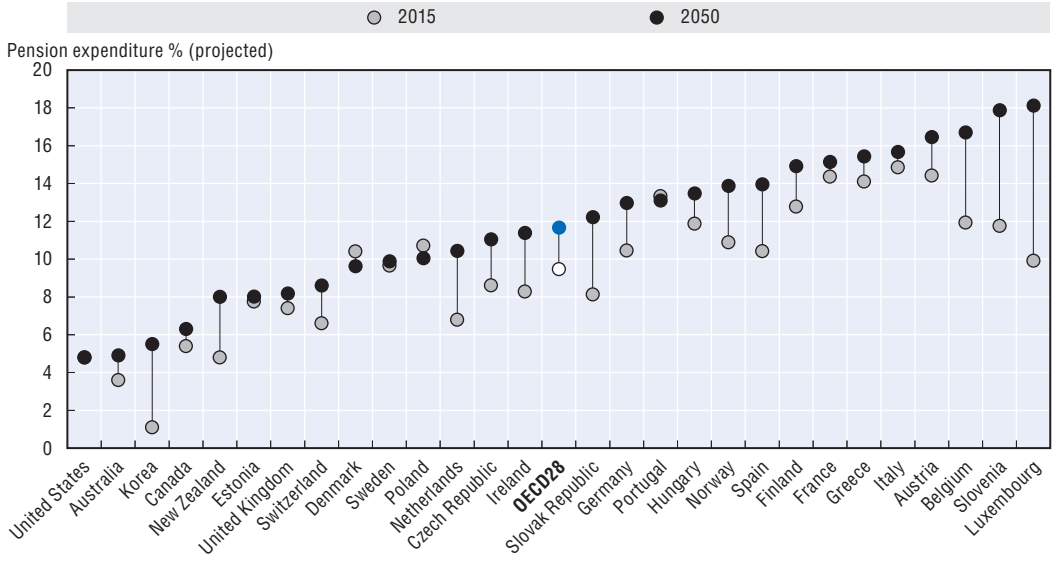
2.4. Improving financial sustainability

On top of the debt burden resulting from the economic crisis, public pension spending as a share of GDP is expected to increase in most OECD countries in the next 35 years, mostly due to population ageing (Figure 2.5). On average across OECD countries public pension expenditure is projected to grow from 9.5% of GDP in 2015 to 11.7% in 2050. This will continue to put pressure on the financing of pension entitlements.

This section deals with policy measures that, temporarily or permanently, boost financial sustainability. They include: increases in pension age, contribution rates in defined benefit schemes, taxes or social security contributions on pension income, and minimum contributory periods; reductions in the valorisation of past and present pension contributions; introduction of automatic adjustment mechanisms; and improvements in administrative efficiency. Policy measures to increase adequacy might add pressures on the financial sustainability of the pension system, and therefore operate in the opposite direction.

Measures to improve financial stability can have effects in the short-term. This is, for example, the case when current pension benefits are frozen (or even lowered in nominal terms) or when taxes on pension income are raised. Stricter rules for early retirement or stronger penalties for early pension benefit withdrawal also produce effects quickly. In

Figure 2.5. **Projections of public pension expenditure as a share of GDP from 2015 to 2050**



Source: Based on national sources and the European Commission. For complete lists of sources see OECD (2013), *Pensions at a Glance 2013: OECD and G20 indicators*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/pension_glance-2013-en*.

StatLink http://dx.doi.org/10.1787/888933156811

contrast, increasing both minimum contributory periods and retirement ages for future cohorts of retirees tend to improve financial sustainability in the long-term only.

Diversification and security

Some pension policy changes providing a fiscal boost in the short-to-medium term took place in Poland in 2014. These came at the expense of reduced diversification. The measures partially reversed the 1999 reform, as pension contributions to the mandatory second pillar were by default redirected to the public pension scheme, even though workers can choose to keep contributing to pension funds instead. Part of the accumulated assets in the private funds was also transferred from privately managed funds to the social security fund. Moreover, assets of those who choose to stay in privately managed pension funds will gradually be transferred to the public system 10 years prior to retirement. These measures will reduce both the public debt and the government deficit in the short term, but will increase the implicit debt of the public pension system and possibly reduce future retirement income in the long term (OECD 2014c).

Pension benefits

A few OECD countries have carried out extensive reforms to improve the financial sustainability through benefit cuts. While this is a less of a social issue in countries where replacement rates are high, such reforms often need to be partly compensated by measures protecting at least the most vulnerable. Among the countries worst hit by the crisis, Greece and Portugal, have continued to cut benefits. In Greece, bonuses for lower income pensioners have been reduced since 2013. In Portugal, bonus allowances for pensioners, the so-called holidays and Christmas subsidies, were abolished in part or fully in 2012-13. However, the Constitutional court has since then ruled out this measure and

the government will implement longevity adjustments to the retirement age rather than reducing the pension benefits.

Taxation and contributions

Most of the improvements in public finances generated by measures affecting the pension systems during the last two years and a half were achieved through higher taxation. Increasing income taxes on pension income is usually a politically difficult reform to carry out, especially in countries where net replacement rates are already low. Tax measures to increase financial sustainability include higher effective taxation of current pension income, higher pension contributions in defined benefit schemes (not generating higher pension entitlements) and lower tax deductions on pension contributions or on assets. The latter can lead to lower coverage or savings rates in the schemes affected by the reform.

In Australia, superannuation taxes for higher income earners were increased in 2012. In Finland, pensioners with pension income above EUR 45 000 have paid an extra tax of 6% on income exceeding the threshold since 2013. In France, the 10% pension bonus for having three children will be subject to taxation. In Portugal, pension taxation was increased by lowering the pension income threshold, while higher taxes rates for the higher income were introduced in 2013-14.

Some OECD countries increased the contribution rates paid into their defined benefit schemes while maintaining benefits levels. In Canada, the contribution rate for the Quebec Pension Plan is increasing from 9.9% in 2011 to 10.8% in 2017. In France, the contribution rate will increase by 0.3 percentage points by 2017 for both employees and employers. In Finland, the social partners decided to increase the contribution rate of mandatory earnings-related systems for private sector workers (TyEL) by 0.4 percentage points annually between 2011 and 2016. In Hungary, the wage ceiling for employees' contributions was abolished since 2013, thereby increasing the amounts paid into the system by individuals with higher earnings. In Luxembourg, the combined contribution rate (employee, state and employer) will begin to increase from 24% to 30% in 2052. In contrast in Ireland, the employer contribution rate was lowered from 8.5% to 4.25% between July 2011 and 2013.

Some countries tightened their tax incentives on contributions to voluntary schemes. In Ireland, temporary levies on private pension assets were extended and increased in 2014. At the same time, tax reliefs on private-pension contributions were reduced for high-income earners. In the Netherlands, the full tax allowance for pension contributions was capped. In addition, the work continuation credit given to all older workers was changed from a general bonus to a targeted credit towards individuals in unemployment or incapacity or with low income. This measure will consequently increase taxes for the groups that are not eligible to the new credit. The employment credit was also targeted towards workers aged 60-64 earning between EUR 17 139 and EUR 33 326 per year since 2013. In New Zealand, employer contributions to voluntary occupational pension schemes were taxed as of April 2012. In Sweden, tax deductions for individual contributions to private personal pensions will be phased out by 2016.

Indexation

In order to contain public pension expenditure, some countries froze benefit indexation temporarily and many countries are moving to less generous benefit-

indexation options. Other countries introduced automatic adjustment mechanisms to strengthen the link between benefit indexation and the financial standing of the pension system. In the Czech Republic, the government temporarily (until 2015) introduced a lower level of indexation. In Finland, the indexation of earnings-related pensions will be limited to 0.4% in 2015. In France, the indexation of pension benefits will now occur in October instead of April as of 2014, but this did not affect pensions below EUR 1 200. In Greece, pension indexation has been frozen between 2011 and 2015. Moreover, pension benefits are now indexed to prices rather than to changes in civil servants' salaries as previously. In Italy, the indexation was frozen in 2012 and 2013, although pensions below EUR 1 400 in 2012 and EUR 936 in 2013 were exempt from this freeze. In Poland, pension benefits were increased by a fixed amount as a temporary measure in 2012.

Other OECD countries will lower long-term indexation. In Hungary, pension benefits have been indexed to inflation instead of a mix of inflation and wages since 2012. In the Slovak Republic, pension benefits will be increasing by some fixed amounts between 2013 and 2017, and thereafter they will follow consumer prices instead of a mix of wages and consumer prices. In Luxembourg, a "reduction factor" which adjusts benefits to contributions was introduced in 2013. In Spain, the indexation will be adjusted within a range depending on the ratio of contributions to expenses, and every five years from 2019 pension benefits will be revised based on changes in life expectancy.

Work incentives

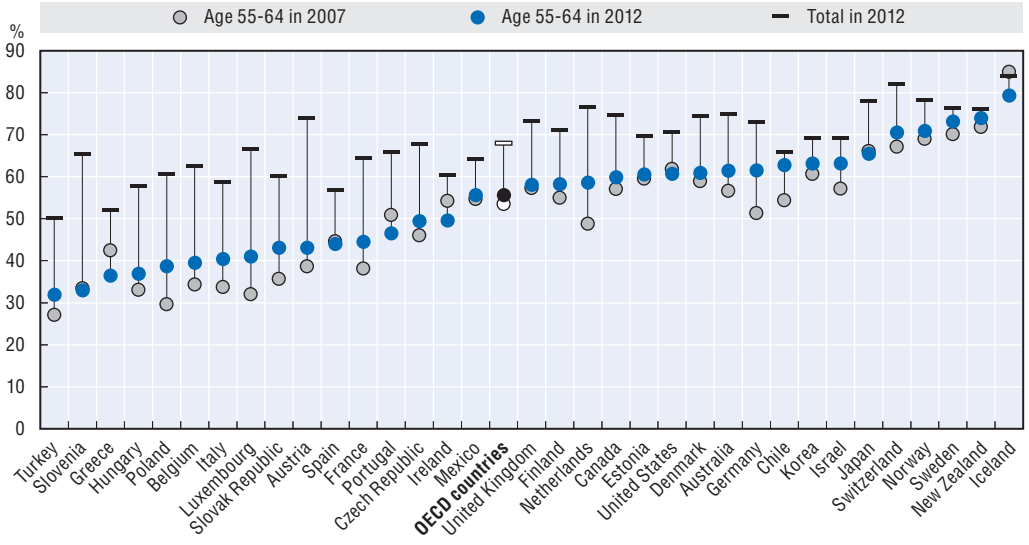
Many OECD countries reformed pension rules to lengthen working lives so that individuals contribute more to improve the sustainability of the system. Some countries implemented increases in minimum contributory periods while limiting the effect of career breaks and part-time work. Most pension reforms are, however, focused on prolonging working lives at the end of the career through: i) increases in the statutory retirement age; ii) tightening of early retirement provisions; and iii) higher financial incentives to work beyond the pensionable age and higher penalties to early pension benefit withdrawal.

Employment rates for individuals aged 55 to 64 remain well below those for other age groups in the vast majority of OECD countries, even though they are relatively high in Iceland, New Zealand, Norway, Sweden and Switzerland (Figure 2.6). The employment rate for workers aged 55 to 64 recovered in almost all OECD countries to levels equal to or above the pre-crisis levels observed in 2007. The exceptions to this are Iceland, the United States, Ireland, Portugal and Greece. Yet, there is significant room for improvement in basically all OECD countries.

The retirement age is probably the most contentious pension parameter. Increasing it is a politically sensitive issue in many countries and has generally been a difficult reform to carry out. At the same time raising the retirement age sends out a strong signal on how individuals are expected to behave when planning for retirement. The majority of the legislated increases in the retirement age often concern future cohorts of retirees and will thus take place in the more or less distant future.

In a few countries, the retirement age was increased to equalise the retirement age of men and women. In Greece, the female pension age was equalised to that of men, increasing from 60 to 65 between 2011 and 2013. In 2013, the retirement age was raised to 67 for men and women with less than fifteen years of contributions. In Italy, the retirement

Figure 2.6. **Employment rate of workers aged 55-64 in 2007 and 2012 and in comparison to that of the total working-age population in 2012**



Source: OECD (2013), *OECD Employment Outlook*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/empl_outlook-2013-en.*
StatLink *http://dx.doi.org/10.1787/888933156826*

age of private sector workers will be equalised to 67 for men and women by 2018. The pension age is also increasing for public sector workers from 61 years to 67 years. However, workers can still retire at any age if they have contributed a minimum period of 42.5 years for men and 41.5 years for women in 2014. The retirement age is also increasing in Slovenia, however from a very low level: the current retirement age is 58 years and 58 years and 4 months for women and men, respectively, and will reach 60 in 2019 for both. In Poland, the retirement age for men and women is increasing from 65 and 60, respectively, to 67 for both but in 2020 for men and 2040 for women.

In an increasing number of OECD countries, the overall retirement age is being increased, sometimes beyond 65 which has generally been the norm in most countries in the past decade. In Canada, the normal retirement age to be eligible to the basic pension (Old-age security) benefit will gradually increase from 65 to 67 years between 2023 and 2029. In Ireland, the pension age increased from 65 to 66 years in 2014, to 67 by 2021 and 68 after 2028. In Hungary, the pension age is increasing from 62 to 65. In Portugal, the retirement age was raised from 65 to 66 years. In the Netherlands, the retirement age will reach 66 by 2019 and 67 by 2023. The normal pension age has been increasing in Spain from 65 in 2013 to 67 in 2027. In the United Kingdom, the pension age will increase to 66 in 2020 and to 67 by 2026. In Australia, the pension age (which has been equal across genders since July 2013) will gradually increase from 65 in 2017 to 67 in 2022. A further gradual increase to 70 in 2035 is currently being discussed.

A few countries have increased minimum contribution periods since February 2012. In France, the minimum contributory periods will increase from 41.5 years currently to 43 in 2030. In Luxembourg, the contributions period for a full pension will increase from 33 years to 40 years by 2052. It will thus still be possible to retire at age 60 for people having started a full career at age 20. Moreover, the 2013 pension reform attempted to strengthen the connection between contributions and retirement income benefits.

Many OECD countries are also restricting access to early retirement. In Austria, the required insurance period for individuals to be eligible to early retirement (Korridorpension) is increasing from 38 years in 2013 to 40 years in 2017. The minimum early retirement age increased in 2014, from 60 to 62 years for men and from 55 to 57 years for women. In Belgium, the age for the early retirement benefit increased to 60.5 years in 2013, and the contribution period to 38 years. These parameters will increase further to age 62 and 40 years in 2016. In Denmark, the early retirement age is currently being increased from 60 to 64 in 2023 while a new senior disability benefit is being introduced. In Portugal, early retirement was suspended until June 2014. However, workers with 30 years of contributions and the unemployed aged at least 57 can still retire early. In Spain, the early retirement age is increasing from 61 to 63 in cases of registered unemployment. Partial retirement has been implemented and it is now possible to work and draw benefits at the same time.

In Finland, work incentives for disability pensioners are strengthened as the temporary rules that enable combining work and disability pension withdrawal were extended until the end of 2016. The part-time pension age is also increased to 61 and early retirement is abolished for private sector workers (TyEL scheme). For workers born after 1951 the national pension and guarantee pension age are increased from 62 to 63. The early retirement pension for the unemployed is being phased out, but unemployed individuals born before 1958 will still be able to retire at 62 without reductions. In Hungary, a new early retirement scheme with tighter access was introduced in 2012. In Poland, early retirement at 62 for women and 65 for men will be possible, but only with a reduced pension.

Financial incentives to prolong working lives have also been strengthened in a number of countries and are often accompanied by increasing flexibility in the opportunities to combine pensions benefit withdrawal and work. In Canada, the benefits of delaying retirement after age 65 were increased and it is now possible to combine work and pension benefit receipt from the mandatory public scheme (Canada pension plan). In the Netherlands, workers retiring before the age of 65 now receive a reduced pension benefit. In addition, early retirement options for workers in physical demanding occupations are being phased out. In Italy, the benefit penalty for early labour market withdrawal will be raised. In Portugal, pension deferral beyond the retirement age will be given an additional bonus. In Sweden, the financial incentives to work more and longer were strengthened in 2014 with the increase in the earned income tax credit for workers over 65.

In contrast, full pension benefits (without penalties) will be awarded below the legal retirement age to people who started their career early in France and Germany. These measures increase pension entitlements, but encourage the targeted people to exit the labour market at a relatively young age. In France, the minimum legal retirement age remains at 62, however, the age at which people may withdraw full pension benefit (without penalty) was lowered back from 62 to 60 for people who entered the labour market before 18 and have worked at least 41.5 years. In Germany, the pension age was decreased from 65 to 63 for individuals with 45 years of contributions.

Administrative efficiency

In pay-as-you-go public defined benefit schemes, improving administrative efficiency tends to reduce public costs. Indeed, the connexion between the pension benefit and the administration cost is often weaker than in a defined contribution scheme where the administration fees more directly reduce the value of accumulated pension savings. This

sub-section will consider reforms that aim to reduce costs and improve performances by merging administrations, implementing regulatory measures or using a new technology.

In Denmark a centralised institution managing several social security benefits was put in place in 2012 to generate economies of scale. In Greece, government-sponsored auxiliary pension funds have been merging since 2011 and will continue to do so until 2015. In Italy, three agencies managing public pensions were merged. In Japan, pension systems for public servants and private school employees are being merged into the employees' pension. In Canada, since 2013, an automatic enrolment regime for the minimum pension (Old-age security) benefits aims at lowering both the administrative burden on seniors and the pension administrative costs, and should also increase take-up.

2.5. Other reforms

The "other reforms" category covers a mixed of policy measures that may be too specific to fit into the previously discussed categories. These reforms may also have an uncertain outcome. In Hungary, insurance companies had to remove gender-specific tariffs as of December 2012 in agreement with the EU Gender directive. This measure will benefit the gender with higher risk (men) over the gender with lower risk (women). In Japan, financially unsound employees' pension funds (EPFs) have been under dissolution since April 2014. The others with assets above the minimum reserve level can continue, but must pass an annual asset test, and no new EPFs can be set up. Financially sound EPFs are encouraged to switch to other types of pension plans (June 2013, effective April 2014).

2.6. Remaining challenges

Pension systems face large economic and social challenges. Demographic, social, and economic developments have fuelled important reforms of pension systems which will likely make the public pension entitlements of future retirees very different from those of current retirees. The extent to which people will be willing and able to work longer and save more and the ability of the social protection system to cushion events that might reduce entitlements will determine whether pensioners can preserve or increase current benefit levels.

Low economic growth and high unemployment, declining tax revenues and deteriorated public finances combined with the long-term effects of rapid population aging make pension systems' objectives more difficult to achieve than in the past. The short and medium-term macroeconomic difficulties severely affect the financing of defined-benefit schemes. For defined-contribution schemes, persistently low interest rates would reduce the returns of asset portfolios and exert downward pressure on replacement rates. Thus, the twin goal of financial sustainability and retirement-income adequacy remains at the top of the pension policy agenda. To help meeting that goal, financial sustainability needs to be pursued together with a set of rules or principles ensuring that benefit levels remain adequate. Public savings obtained by cutting benefits to consolidate public finances might indeed lead to inadequate pension benefits, and thereby be offset down the road by larger spending on safety nets to protect the most vulnerable.

One of main challenges that many OECD countries face is to increase the effective retirement age. While the pension age can still be raised in many countries, this alone may be insufficient to ensure that people effectively work longer; there might be other barriers (on the labour demand side, for example) which prevent older workers from finding and

retaining jobs. Public policies to reduce age discrimination, to enhance working conditions, to increase training opportunities for older workers, while offering possibilities of career developments at older ages, are essential. To make this happen employers have to recognise the potential of the older workforce as a strategic resource.

Another challenge is how to share the financing burden more fairly across generations. Since the mid-1980s relative income poverty has shifted from the elderly to the young (OECD 2014b). It is hence not clear whether, given population-ageing related costs, younger generations will be willing to shoulder a growing level of contributions and taxes. The important policy questions are then about the affordability of such increases for future workers and how the burden can be best shared across generations. For example, some countries might shift part of the financing of pensions (e.g. that related to safety nets contained in the first pillars) from wage-based contributions to more general taxation, thereby reducing labour costs.

How to effectively shield workers from social and labour market risks affecting their pension entitlements will also be critical. A strong contributory principle in pension benefits implies a strong link between pension benefits and paid employment. And currently, in most OECD countries, the largest share of pension benefits are related to paid employment and to the earnings received while working. Periods spent out of employment (unemployment, caring for children and elderly relatives, etc.) and in low-earning employment may have important consequences for long-term pension entitlements and on retirement income adequacy.

Private pensions which are voluntary in many OECD countries raise specific challenges. The main concern is that some people are not contributing enough to secure a comfortable retirement income. Participation in and contributions to these plans are largely the result of decisions made by employers and individuals, which may lead to wide disparities and increasing income inequality in old age (see OECD, 2012).

Some countries have opted for the automatic adjustments of pension systems, based on demographic and economic developments, yet their correct design and the identification of potential problems which may derive from their implementation are important challenges to address. Automatic adjustment mechanisms are an important innovation reducing the political risk associated with pension reforms, but financial sustainability might be enhanced at the expense of lower social sustainability. For example, as discussed above, increasing the official retirement age does not ensure that people will actually work longer.

Rebuilding trust is also an important challenge that policy makers face. Better information and increased transparency about the pension entitlements would improve confidence in the pension system or at least would trigger more efficient governance. It may also help people make better savings and labour market decisions and adapt their behaviours to changing economic and social circumstances. Young people in particular need to trust the long-term stability of the pension system and the pension promise that is made to them.

Notes

1. The equivalisation of household income enables comparisons of households of different size. For a more comprehensive overview on adequate living standards in old age, please see Chapter 2 in OECD *Pensions at a Glance* 2013.

2. A drawback of the relative income poverty rate measure is that it is computed only with reference to incomes and does not take into account either assets or in-kind services which may substantially improve living standards in old-age.
3. Pension benefits increases linked to the adjustments of indices are treated in the section below on indexation.

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ANNEX 2.A1

Details of pension reforms, February 2012-September 2014

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014**

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Australia	Abolition of the 70-year age limit on compulsory contributions to private pension schemes (2013).		Mandatory DC contributions increased from 9% to 9.5% from July 2014.	Increased superannuation taxes for high earners from 2012. Temporary higher threshold for concessional contributions by older workers from 2013. Excess concessional contributions taxed at individuals own marginal tax rate from July 2013.	From 2017 Age Pension will be indexed only to Consumer Price Index (subject to passage of legislation). General concessional contributions cap indexes to AUS 30 000 from July 2014.	Gradual increase in the retirement age for both men and women to 70 in 2035, subject to passage of legislation.	Introduction of "MySuper" – MySuper products replaced default superannuation products for all new accounts from 1 Jan. 2014. All existing default balances have to be transferred into a MySuper account by 1 July 2017. The SuperStream project will establish mandatory, uniform e-commerce standards for contributions to superannuation funds and for transfers between funds ('rollovers'). Implementation will be complete by the end of 2015-16.	
Austria	Two new voluntary DC schemes to supplement the public pension system were introduced in 2012.					The early retirement age due to long insurance periods was increased from 60 to 62 for men and from 55 to 57 for women in 2014. Increasing to 62 until 2027. Conditions for early retirement have been tightened. The required insurance period will increase from 38 years in 2013 to 40 years in 2017. For cohorts born 1955 and later the early retirement penalty will increase from 4.2% to 5.1% (max. of 15.3%).		
Belgium						The early retirement age will increase to 60.5 and the contribution period will increase from 38 years in 2013 and reach 62 and 40 years in 2016.		

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Canada	A new retirement savings plan (Pooled Registered Pension Plan), voluntary except in Quebec and based on auto-enrolment of employees working for an employer who chooses to opt in is likely to increase coverage in sectors under the federal jurisdiction (2012), in Alberta (2013), Saskatchewan (2013), Quebec (2013) and British Columbia (2014). Other provinces such as Ontario consider passing similar legislation.		Increase of the general drop-out provision for the Canadian Pension Plan to exclude 17% (from 15%) of the contributory periods of low earnings from the benefit calculation. Project to create a new mandatory public provincial pension plan in Ontario.	Increase in the contribution rates for the public contribution second-tier programs in Quebec.	From 2018 an automatic mechanism will be implemented for the Quebec Pension Plan to ensure stable plan funding.	The Old-Age-Security (OAS) and the Guaranteed Income Supplement benefit age will gradually increase from 65 to 67 between 2023 and 2029. OAS pensions for late retirement will increase. The age of allowance receipt will increase from 60 to 62. People over 60 will be able to collect CPP benefits and work. Post-retirement benefit was introduced for individuals to keep working while receiving CPP benefits. Contributions will be mandatory for people under 65 and optional from 65 to 70.	An automatic enrolment regime for OAS benefits is being phased in since 2013. This will, reduce the administrative burden on seniors administrative costs and might increase take-up.	
Chile	From 2012-2014 self-employed will be automatically enrolled with the option to opt-out. From 2015 all eligible self-employed workers will have to contribute to the system.	Minimum and maximum limits for foreign currency hedges have been established. Since 2012 investment thresholds per issuer were reduced to limit the potential exposure to a single issuer and encourage diversification. From mid-2013 fund E was allowed more flexibility in case of massive funds changes.					As an outcome of two auctions in 2012 and 2014, management fees decreased from 1.14% to 0.47% of an account holder's monthly earnings. Also, the fees for providing disability and survivor insurance decreased from 1.49% to 1.15%.	
Czech Republic	Creation of a second pillar of voluntary individual accounts, effective from 2013.	Option to divert 3% of contributions to a DC plan conditional on individuals making an extra 2% contribution and subject to a reduction in public-pension benefits from Jan. 2013.			Temporary change to indexation rules for old age, survivor and disability pensions between 2013 and 2015. This measure will lower pension increases (2012).			

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Denmark					Increased early retirement age (2014). A new "senior disability benefit" for workers in physically demanding jobs with work-related health problems is being created (2014).		Creation of a centralised institution to handle the management and payment of several social security benefits (2012).	
Estonia			From 2013 a new pension supplement from public pillar is available to pensioners having cared for a child up to the age of three.					
Finland		The solvency regulations were modernised in 2013 in order to rationalise control of different risks.		Since 2013 pensioners pay an extra 6% tax for annual pension income exceeding EUR 45000. The social partners have agreed to increase the combined employer/ employee contributions to earnings-related plans (TyEL) by 0.4% annually between 2011 and 2016.	Planned cut in pension indexation planned for 2015 (earnings-related and KELA). Indexation will be limited to 0.4% instead of well over 1%.	The legislation enabling disability pensioners to have work for two years without losing right to a pension will be extended until the end of 2016. The part-time pension age will increase to 61 for those born after 1953 and cuts in pension accrual will be implemented. Early retirement is eliminated under TyEL for workers born after 1951. For KELA the early retirement age is increasing to 63. The unemployment pension program is phased out in 2014. Long-term unemployed born before 1958 can still retire at 62 with a full pension.	New rules on transparency for private sector providers have been submitted to Parliament. The new law will require employees able to influence the company's investment decisions to report their stock exchange holdings and business dealings (Jan. 2015).	

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
France	The contribution period used for benefit computation will be more generous for maternity, training, unemployment, apprenticeships, students and part-time work.			The 10% pension bonus for having at least three children will be subject to taxes. The contribution rate will increase by 0.3 percentage points for both employees and employers by 2017.	From 2014, indexation will occur in Oct. against Apr. previously. Pensions below EUR 1200 were not frozen between April and Oct. 2014.	The contribution period for a full pension will increase by one quarter every three years and reach 43 years in 2035. While the retirement age remains at 62, a person having contributed a full period will be able to retire without any penalty from the age of 60. Individual accounts will be established to take into account arduous work; they will open rights to professional training and allow a shorter contribution period.		
Germany			Parents of children born before 1992 will now receive pension credits for the first two years of their child's life (July 2014).			The retirement age is lowered from 65 to 63 for people with 45 years of contributory years.		
Greece			Major changes were made to pensions provided to different sectors (industry, agriculture, self-employed) and guaranteed by the state 2011-2015. Bonuses for lower pensioners reduced from 2013.		No increase in mandatory public pensions 2011-2015. Less generous indexation; pensions indexed to CPI instead of changes in civil servants' pensions from 2014.	Increase in retirement age for women from 60 to 65 from 2011-2013. Increase in the pension age from 65 to 67 in order to receive a full pension (Nov. 2012).	Mergers of all remaining auxiliary pension funds 2011-2015.	
Hungary			The contribution ceiling was abolished in 2013.		Pensions indexed to inflation from 2012.	Gradual increase in pension age from 62 to 65 between 2012 and 2017.		According to the EU Gender directive insurance companies had to remove their gender specific tariffs, new unisex table were used from Dec. 2012.

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Iceland								
Ireland	In Mar. 2014, a road-map for the introduction of an occupational pension scheme for those currently not covered is being implemented. Its implementation will depend on economic recovery and stability.	A new benefit priority was established from 25 Dec. 2013 ensuring a fairer distribution of DB plan assets in case of bankruptcy. Re-establishing the funding standard of DB plans over a three-year period, starting June 2012, to protect benefits against volatility in the financial markets. DB plans have to hold additional assets from 2016. DB plans will periodically have to submit an actuarial certificate to the Pension Board (2012). The Standard Fund Threshold is being reduced from EUR 2.3 million to EUR 2 million from 2014. The capitalisation factor used for DB pension amounts is age-dependent from 2014.	. New affordability measures to assist pensioners, persons with disabilities, and carers who receive the Household Benefits Package. The HBP will be also assist with water costs. The value of this additional benefit will be approximately EUR 100 a year to each recipient, beginning in 2015.	Lowered employer contribution rate from 8.5% to 4.25% from Jul. 2011 to 2013 A temporary tax levy of 0.15% of occupational pension assets was introduced in 2014 for two years in addition to the 0.6% levy that was introduced in 2011. Tax relief on private-pension contributions for high earners reduced from 41% to 20% between 2012 and 2014.		Pension age increasing from 65 to 66 in 2014; to 67 from 2021 and to 68 from 2028.		
Israel			Employees' contribution to mandatory DC occupational plans increased from 2.5% to 5% in 2013 and employers' contribution increased from 2.5% to 10%.					

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Italy					In 2012 and 2013 indexation of pensions benefits were frozen. Exceptions to this were: pensions below EUR 1400 in 2012; and below EUR 936 in 2013.	From 2012 a new early-retirement scheme with tighter access requirements will replace the seniority pension. The pension age for women is increasing from 60 to 66, to match that of men by 2018. The pension age will thereafter increase with life expectancy. A number of safeguard clauses have been introduced for the Esodati as to protect this group from the increase in pension age.	Three agencies managing public pensions have been merged (INPDAD and EMPALS accounts transferred to INPS by Apr. 2012).	
Japan	The qualifying period for the national pension will be shortened from 25 to 10 years from Oct. 2015. Extend employees' pension insurance for part-time workers from Oct. 2016. The basic pension for survivors is being extended to motherless families from Apr. 2014.	The bill to terminate employees' pension funds (EPFs) was approved in June 2013 and became effective April 2014. Financially unsound EPFs are being contracted out or dissolved within five years. No new EPFs can be set up. EPFs with assets above the minimum reserve can continue subject to annual asset tests beginning in 2019. Financially sound EPFs are also encouraged to switch to other types of pension plans Tax Qualified Pension Plan (TQPP), which was one of the main defined benefit type plans ended in March 2012.	Provide low-income, old age pensioners with welfare benefits from Oct. 2015. Possibility for different categories of workers to make up gaps in contribution records of 2-10 years by paying between Oct. 2012 and Sep. 2015. The exceptional top-up level of 2.5% applied to pension income will be abolished from Oct. 2013 to Apr. 2015	. Women on maternity leave are exempt from pension contributions since Apr. 2014.	The ad hoc nominal freeze of pension benefits is being abolished by 2015.		Public servants and private school employee's pension systems are being unified into the employees' pension from Oct. 2015.	
Korea	New basic pension introduced in July 2014.							

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Luxembourg	The minimal monthly contribution for voluntary insurance has been lowered from EUR 300 to EUR 100 (2013).		The basic pension is increasing slightly as a result of the new pension reform (on average by about 0.44% per year) from October 2012.	The contribution rate (employee, state and employer) will gradually increase from 24% to 30% of covered wages by 2052.	A new "reduction factor" will limit the adjustment of benefit levels to a portion of the increase in the wage level if benefits exceed contributions (2013).	Contribution requirements for a full pension at age 60 will increase from 33 to 40 years by 2052.		
Mexico	In 2013 the Pension para *Adultos Mayores* was extended to all people aged 65 and over residing in the country for at least 25 years without any pension or with a monthly pension income below MXP 1092.	The pension funds (SIEFOREs) have introduced age dependent limits on fund investments in equities (2013).		Income tax exempt for pensioners with income up to 25 minimum wages.				
Netherlands		A law improving the governance of occupational pension plans was adopted in July 2013.		Until 2013, it was possible to get a full tax allowance for pension contributions (accruing at 2.25%). Tax exemption will only be granted for accrual rates up to 2.15% and 1.75% annually from 2014 and 2015. The work continuation credit and the mobility credit were abolished for all except for older workers with unemployment insurance or work incapacity benefits, and for low-income groups. From 2013 the employment credit only applies to employers who employ workers aged 60-64 with an annual income between EUR 17139 and EUR 33326.		Workers retiring before age 65 will receive a reduced pension for each year before the normal retirement age (2012). The statutory retirement age will increase to 66 in 2019 and to 67 by 2023. Early retirement for physically demanding occupations conditions are being phasing out.		
New Zealand		KiwiSaver default providers will maintain a conservative investment strategy with 15%-25% of allocation in growth assets.	From Apr. 2013 the minimum contribution required contribution for employees and employers will rise from 2% to 3% of earnings.	Employer contributions no longer tax free as of Apr. 2012.			KiwiSavers providers will be required to post information on their websites regarding performance, fees, returns, portfolio and key staff information on quarterly basis (2013).	

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Norway		New rules for occupational pension plans allow employers greater flexibility in designing and funding pension plans (2014).	New rules for calculating the public old age pension based on lifetime income will be gradually introduced for the cohorts 1954–1962.					
Poland	Mandatory contributions to the privately managed DC scheme (OFE) were turned optional: workers can opt-in to allocate 2.92% of their gross wages to OFEs while the default option is to contribute to the public NDC scheme.	OFEs are prohibited to invest in Polish treasury bonds or in debt instruments guaranteed by the Treasury. In 2014, pension funds have to hold a minimum threshold of 75% of their assets in equities. That threshold will gradually decrease to 15% in 2017.		New tax incentives for IKZE (a type of voluntary personal plan) – Exempt-Exempt-Tax scheme, with special, 10% flat tax rate (i.e., lower than standard income tax).	In 2012 pension benefits were increased by a fixed amount (temporary change), regardless of initial levels.	Retirement ages of 60 for women and 65 for men will gradually increase to 67 in 2040 and 2020, respectively. Partial retirement (at 62 for women and 65 for men) will be possible with pension benefit reduced by 50%.	On Feb. 2014, 51.5% of the net assets of privately managed pension funds were transferred to the Social Insurance Institution. Moreover, the assets of those who chose to stay in OFEs will be gradually transferred to the public system 10 years prior to the retirement age. Assets so far accumulated by those who decided to move to the public pension scheme will also be transferred.	
Portugal			Under the 2012 State Budget the 13th and 14th monthly allowances for pensioners were abolished fully or in part for the majority of pensioners. A mild version of these measures was also enacted in 2013. The Constitutional Court ruled these measures out. .	The pension-income threshold for the CES (extraordinary solidarity surcharge) was lowered from EUR 1300 to EUR 1000. The CES is levied at between 3.5% and 10%, depending on income. New rates of 15% and 40% were introduced in 2013-2014 for higher income bands. Pension contributions have been increased for public sector workers from 2.25% to at least 3% of salary (exclusively for funding the special health service for workers in the public sector (ADSE))	The determination of the sustainability factor, which links the level of pensions to increasing life expectancy, was changed. It will be computed as the ratio between life expectancy in 2000 (and no longer in 2006) and life expectancy in the year prior to retirement. The sustainability factor will be used to increase the retirement age rather than to reduce retirement pension.	In May 2012 early retirement was suspended and only long-term unemployed can currently have access to a special early retirement. The retirement age was raised from 65 to 66 as from 2014. Retirement age will be linked to life expectancy to reach 67 in 2029.		

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Slovak Republic	DC scheme made voluntary and possibility to opt into the public earnings-related scheme.	Introduction of three funds types – conservative, mixed and growth – supplemented by a new equity-index fund from Apr. 2012. Principal guarantee on investment performance introduced, but will be restricted to the least risky (bond) fund from Apr. 2012.			From 2013 to 2017 pension benefits will be increased by fixed amounts and thereafter valorisation will follow consumer prices.			
Slovenia						Pension ages are increasing from 58.3 for men and 58 for women with 40 years and 38.3 years contribution records. In 2019 the pension age will be 60 with 40 years.		
Spain			Adjustment of relevant parameters of the pension system to change in life expectancy every five years from 2019.		Pension benefits will be adjusted according to the ratio of contributions to expenses with a maximum and minimum adjustment.	Normal pension age is set to increase from 65 to 67 between 2013 and 2027. Full benefits are available at age 65 with 38.5 years of contributions. The early retirement age is increasing from 61 to 63 for involuntary unemployed. The contribution period for early retirement is increasing from 31 to 33 years in case of involuntary early retirement. Partial retirement implemented to allow workers close to retirement to work part-time.		

Table 2.A1.1. **Details of pension reforms, February 2012-September 2014** *(cont.)*

By country and prime objective

Country	Coverage	Diversification and security	Pension benefits	Taxes and defined benefit contributions	Indexation	Work incentives	Administrative efficiency	Other
Sweden				The basic pension income tax deduction for people over 65 was increased in 2014. Tax deductions for private personal plans are being phase-out and abolished by 2016.		Earned Income Tax Credit (EITC) was enhanced in 2014. The EITC is higher for workers over 65.		
Switzerland				In 2012, the maximum contribution for insured persons who are not gainfully employed increased to CHF 19600 (50 times the minimum contribution).		Greater flexibility is provided for deferring labour market exit since insured persons may carry on paying contributions to the pension fund until 70.		
Turkey				In 2013, tax advantages of voluntary private pensions were replaced with government matching 25% of individual contributions up to a threshold in order to boost private savings.				.
United Kingdom	Large employers (120 000 plus employees) must automatically enrol workers in a company scheme or state-run National Employment Savings Trust (NEST) from Oct. 2012; medium-sized employers (50 plus) from June 2013, and small employers (fewer than 50) from May 2015.	New rules for defined contribution pension withdrawals were legislated in May 2014 and will enable large lump-sum withdrawals.	Contribution rates will increase between 2017 and 2018 from 1% to 3% for employers and from 1% to 5% for employees (including 0.2% to 1% of tax relief). From 2016, a new state pension (single-tier pension, STP) will replace at a higher level both the basic pension and the minimum income guarantee (Pension Credit).			Equalise pension ages at 65 for both genders by 2018. Bring forward pension age to 66 by 2020 and to 67 by 2026.	NEST scheme will create economies of scale compared to current DC plans.	
United States				Taxes for Old-Age, Survivors, and Disability Insurance were cut during 2012 as a stimulus measure.				

Note: DB = defined benefit; DC = defined contribution; NDC = notional accounts; GDP = gross domestic product; CPI = consumer price index; admin. = administrative; cohort = date-of-birth group.

ANNEX 2.A2

Relative income poverty among people over 65 and for the total population in 2011

Table 2.A2.1. **Relative income poverty among people over 65 and for the total population in 2011**[1]

Countries	Population	Old age
Australia	13.8	33.4
Austria	9.0	10.5
Belgium	9.5	10.5
Canada	11.7	6.8
Chile	17.8	20.5
Czech Republic	5.9	2.4
Denmark	6.0	7.1
Estonia	11.7	7.4
Finland	6.6	9.4
France	8.0	4.5
Germany	8.7	8.9
Greece	15.2	7.3
Hungary	10.4	5.2
Iceland	5.9	3.3
Ireland	9.7	5.2
Israel	20.9	20.6
Italy	12.6	10.6
Japan	16.0	19.4
Korea	14.6	48.6
Luxembourg	8.1	2.7
Mexico	21.4	31.2
Netherlands	7.8	1.6
New Zealand	9.8	9.0
Norway	7.7	4.3
Poland	11.1	10.3
Portugal	11.9	8.0
Slovak Republic	8.3	6.3
Slovenia	8.9	15.2
Spain	15.1	7.0
Sweden	9.7	10.1
Switzerland	10.3	24.0
Turkey	19.2	18.4
United Kingdom	9.5	10.5
United States	17.4	18.8
OECD	**11.5**	**12.3**

Note: The poverty rate is computed only with reference to incomes and does not take into account either assets or in-kind services which may substantially improve living standards in old-age.

1. Data refer to 2009 for Japan; 2010 for Belgium; 2012 for Australia, Finland, Hungary, Korea, Mexico, the Netherlands and the United States. 2011 data for the United Kingdom and Ireland are provisional.

Source: OECD Income Distribution Database. OECD (2014b), "Income Inequality Update – June 2014", OECD Publishing, Paris, *www.oecd.org/els/soc/OECD2014-Income-Inequality-Update.pdf*.

StatLink http://dx.doi.org/10.1787/888933156968

Chapter 3

Saving for retirement and the role of private pension provision in retirement readiness

This chapter examines the potential role of private pensions in the retirement readiness of working-age individuals in selected OECD countries. A description of the methodology used is followed by a look at the potential importance of private pensions in total pension income at retirement. The chapter then addresses several policy questions on whether working-age individuals would have sufficient pension income at retirement to reach certain poverty thresholds; to be at least as well-off as the cohort already retired; and to maintain a certain level of their standard of living at retirement.

The analysis herein also identifies population subgroups that may rely less on private pension provision at retirement and those subgoups that are at greatest risk of having a low pension income. The chapter finally looks at the potential impact of housing wealth, different economic conditions and labour market exit ages on the potential role of private pension provision in the retirement readiness of working-age individuals.

3.1. Introduction

People need to save enough to finance their retirement. People can save to finance retirement by paying contributions to different pension plans during their working career in order to build pension rights, accrue benefits and/or accumulate assets that they will use to finance their retirement. Such pension plans include, for instance, pay-as-you-go (PAYG) public pension plans, as well as defined benefit (DB) and/or defined contribution (DC) funded private pension plans. Contributing to these plans can be mandatory or voluntary. Although people can rely on other kinds of assets to finance retirement (e.g. life insurance contracts, bank deposits, housing), pension plans are the only vehicles earmarked for retirement. It is therefore important for policy makers to assess whether people are saving enough in those plans to make sure that appropriate policies are implemented to ensure future retirees' wellbeing.

Private or more generally, funded pensions play an important role in the retirement income systems of many OECD countries. Funded private pensions complement public PAYG-financed pensions, and in some countries might represent, in the future, the main source of retirement financing (e.g. in Australia or Chile). Together, funded and PAYG plans are integral parts of a country's pension system. As part of the overall system, funded private pensions can therefore play a major role in avoiding adequacy gaps. Moreover, the role of funded private pensions in the financing of retirement income may increase in the future as a result of reforms implemented in public pension systems.

This chapter therefore assesses the role that private pensions play and could play in the retirement readiness of the working-age population.[1] It estimates the potential future pension income of today's working-age population by calculating individuals' actual accumulation of pension rights and pension assets in different pension plans available to them in their respective countries (e.g. PAYG public pensions, DB and DC private pensions) and complementing it with what individuals may accumulate going forward until they retire according to different scenarios. Six OECD countries are examined: Chile, France, the Netherlands, Norway, the United Kingdom, and the United States.[2] The analysis identifies subgroups of the population in each country that may be at greatest risk to be insufficiently prepared to finance their retirement and shows that there is room in some countries to strengthen the role of private pensions in order to decrease the proportion of people that may have insufficient pension income. As a result, the chapter provides a set of policy options to further develop the complementary role of private pensions in financing retirement.[3]

The analysis shows that private pensions already play an important role in complementing retirement income in most of the countries examined, especially when they are mandatory. Yet, private pensions do not generally represent the main source of retirement financing, except for high-income individuals in some cases. Younger generations may be more likely than older generations to rely on private pensions at retirement, except in countries where private pensions have already been in place for a

long time. While one could expect that younger generations will be better prepared for retirement thanks to the bigger role that private pensions may play in the future, other factors, such as reforms in public pension systems and lower returns on investments going forward, may offset the positive impact of higher private pension coverage. Finally, a combination of higher coverage rates of private pensions and higher contributions, higher returns on assets, higher productivity growth, and higher effective age of retirement (leading to longer contribution periods) may increase the role that private pensions play in making people better prepared for retirement.

Section 3.2 of the chapter assesses the potential role of private pensions in the retirement readiness of the working-age population in Chile, France, the Netherlands, Norway, the United Kingdom and the United States. It first briefly describes the methodology used to estimate the potential pension income at retirement of working-age individuals and to build indicators of retirement readiness. It then assesses the potential relative importance of private pensions in total pension income at retirement (subsection 3.2.2). The following three subsections address different policy questions related to retirement readiness: Would working-age individuals have a present value of pension income at retirement above certain current poverty thresholds (subsection 3.2.3)? Would working-age individuals have sufficient pension income at retirement to be at least as well-off as the cohort already retired (subsection 3.2.4)? Would working-age individuals have sufficient pension income at retirement to maintain a certain level of their standard of living at retirement (subsection 3.2.5)? The analysis goes on with the assessment of the potential impact of housing wealth on retirement readiness (subsection 3.2.6). The section ends identifying population subgroups relying less on private pensions at retirement and those at greatest risk of having low pension income (subsection 3.2.7) and with a sensitivity analysis (subsection 3.2.8).

Section 3.3 provides a set of policy options to strengthen the role of private pensions in financing retirement and Section 3.4 concludes. Annex 3.A1 describes the full methodological framework. Annex 3.A2 provides selected summary tables for each country covered in the chapter. Finally, Annex 3.A3 briefly describes the pension systems of each country.

3.2. Assessing the role of private pensions in the retirement readiness of working-age individuals in selected OECD countries

3.2.1. Brief description of the methodology and indicators used

This subsection briefly describes the methodological framework used to estimate the potential future pension income of working-age individuals at retirement and to build indicators of retirement readiness.[4]

The analysis uses household and individual survey data as well as administrative data.[5] It collects information about individuals' socio-economic characteristics, careers, earnings level, as well as pension rights and pension assets already accumulated in the pension system. Panel data are used whenever possible to gather information about individuals' past. The analysis focuses on individuals aged 35 to 64 at the time of the data collection. Data refer to 2009, except for the Netherlands (2008).

As a baseline, the analysis only considers sources that are earmarked for retirement. This includes PAYG public pensions, funded private pensions, as well as public safety-net or solidarity pensions.[6] In the case of funded private pensions, occupational and personal pension plans are taken into account, independently of the financing vehicle (a pension

fund or an insurance company for example) and of the type of plan. The analysis distinguishes two main pension plan types: funded plans where benefits depend on rights accumulated (e.g. traditional occupational DB pension plans in which benefits are determined by reference to a formula based on the number of years of service and the salary) and funded plans where benefits depend on assets accumulated (e.g. occupational DC pension plans, occupational hybrid pension plans or personal pension plans, in which benefits are determined by reference to the contributions paid and the investment return achieved with those contributions, with or without guarantees).[7]

The analysis first assesses what people have already accumulated in terms of pension rights and pension assets and then complements this accumulation with what they may accumulate going forward until they retire according to different scenarios to estimate their potential gross pension income at retirement. The analysis considers three scenarios representing different possible states of the world (pessimistic, optimistic and intermediate).[8] They vary according to four economic variables (inflation, productivity growth, rate of return and discount rate) and one individual behaviour variable (age of retirement).[9]

Subsections 3.2.2 to 3.2.7 present different indicators, calculated under the intermediate scenario, to assess the role of private pensions in the retirement readiness of working-age individuals. All the indicators are calculated before tax. The intermediate scenario, described in the common methodology (Annex 3.A1), assumes an inflation rate of 2%, an aggregate productivity growth of 1.5%, an average real rate of return of 3.5% and a discount rate of 2% for the next 30 years. It also assumes the same age of retirement as the one currently observed on average in each country.[10] These assumptions differ from the ones used in the OECD *Pensions at a Glance* series (see OECD, 2013).

The sample includes people at different ages, between 35 and 64, who will retire at different points in time. Consequently, in the case of some indicators, in order to determine the percentage of people with potential pension income above or below certain thresholds, the analysis needs to bring their potential pension income to the same point of time, calculating its present value. To calculate the present value, the analysis focuses on purchasing power (discounting by inflation) and on income distribution (discounting by wage growth, i.e. productivity growth and inflation). Box 3.A1.1 (Annex 3.A1) discusses this matter in more detail.

The first indicator looks at the average composition of total pension income at retirement. Total pension income is defined here as the sum of potential income from the state/public pension plan (including contributory PAYG pensions and non-contributory safety-net programmes), funded pension plans where benefits depend on assets accumulated and funded pension plans where benefits depend on rights accumulated. This indicator allows a direct assessment of the potential importance of private/funded pensions in total pension income at retirement, on average, for working-age individuals.

The second indicator shows the proportion of working-age individuals whose present value of future pension income may fall below a current measure of poverty. Preventing old-age poverty is of prime policy relevance in all countries. As a minimum requirement, people should therefore build enough rights and accumulate enough resources during their working life to be able to receive at retirement an income that puts them above a certain poverty threshold. The analysis uses two measures of poverty to assess the role played by private pensions: the country-specific measure of poverty and the OECD measure

of poverty (people are considered poor if they earn less than 50% of the median equivalised population income).[11] The potential future pension income is discounted and compared to today's values of poverty thresholds. The analysis uses inflation as the discount rate when comparing to an absolute measure of poverty which is adjusted for inflation according to the rule in the country. Otherwise, the discount rate used is wage growth.

The third indicator compares future generations of retirees with current generations of retirees in real terms. In the context of growing economies, progress should allow future generations to do better than current ones. It is therefore interesting to assess how working-age individuals' future potential pension income compares with current retirees' average pension income. The analysis calculates the average pension income of current retirees using survey or administrative datasets. It focuses the comparison on recent retirees, rather than the entire cohort of retirees, to compare individuals with more similar characteristics. As the comparison is done in real terms (the future potential pension income of working-age individuals is discounted by inflation), this indicator also reflects the relative purchasing power at retirement of different subgroups of the population.

Fourthly, the analysis assesses the ability to maintain one's standard of living at retirement and uses replacement rates as reference indicators.[12] The replacement rate is defined as the ratio between pension income at retirement and pre-retirement earnings. As there is no consensus on the proper denominator to represent pre-retirement earnings, the analysis calculates replacement rates in three different ways, using as a measure of pre-retirement earnings final earnings, inflation-indexed career-average earnings and wage-indexed career-average earnings.[13] These replacement rates are complementary to the ones published in the OECD *Pensions at a Glance* series and differ from them in various aspects, as it is described in subsection 3.A1.11 in the Annex 3.A1.

The analysis uses two different benchmark replacement rates. First, it uses the OECD average gross replacement rate as calculated in OECD (2013) for an average earner working a full career (54%). This benchmark represents a sort of maximum replacement rate an individual can achieve on average in the OECD given current rules. There is however significant cross-country variation in how pension systems work and how much they can deliver to individuals. Comparing replacement rates achieved in countries with different pension systems to the same benchmark may not fully reflect the objectives of each system. The analysis therefore also uses a country-specific benchmark replacement rate, its level depending on the objectives of the pension system of each country.

Housing can also play an essential role in complementing pension incomes. It is the main asset that people have in many countries. The analysis therefore assesses the potential impact of housing wealth on retirement readiness in subsection 3.2.6. It considers the option of converting housing equity into a stream of income. The net value of the house can be used as collateral to get annuity payments at retirement until passing away.[14] Obviously, home ownership will increase the amount of income that people may have to finance retirement.

Subsection 3.2.7 summarises the results found for the intermediate scenario by identifying population subgroups relying less on private pensions at retirement and those at greatest risk of having a low pension income. Subsection 3.2.8 looks at the impact on the results of changing the scenario.

3.2.2. How much private pensions may represent in total pension income at retirement?

Depending on their mandatory or voluntary nature, funded private pensions may cover different shares of the working-age population in different countries. On the one hand, public pensions are contributory and mandatory in all the countries studied except Chile. In Chile, people are entitled to a public pension (i.e. solidarity pillar) if they have accumulated insufficient assets in their mandatory DC plan to give them a retirement income above a certain income threshold. Private pensions on the other hand are mandatory in half of the countries studied: Chile, the Netherlands and Norway (dark blue cells in Table 3.1 represent mandatory plans). In the Netherlands and Norway, all working-age individuals will receive both a public pension and a private pension at retirement.[15] In the other countries, private pensions are voluntary (cells in light blue) and may cover only partially the working-age population at retirement. Coverage rates vary from 0.25% of the working-age population for DB occupational pension plans in France to 75% for DC and hybrid occupational plans and personal pension plans in the United States. Personal pension plans are also voluntary in the Netherlands and may cover as much as 47% of the working-age population.[16]

Table 3.1. **Coverage of different pension income sources at retirement**

	PAYG/public pension	FP based on rights	FP based on assets
Chile	**92%** of the w.a.p., mostly low to medium-income, younger generations, women, in the private sector, self-employed	Non-existent	Universal
France	Universal	**0.25%** of the w.a.p., mostly high-income	**39%** of the w.a.p., mostly high-income, younger generations, men, in the private sector, self-employed
Netherlands	Universal	Universal	**47%** of the w.a.p., mostly high-income, middle-aged generations, men
Norway	Universal	Universal in the public sector **58%** of the w.a.p., mostly low-income, older generations, women	**42%** of the w.a.p., mostly high-income, younger generations, men, in the private sector
United Kingdom	Universal	**52%** of the w.a.p., mostly high-income, middle-aged generations, women, in the public sector, employees	**68%** of the w.a.p., mostly high-income, younger generations, men, in the private sector
United States	Universal	**33%** of the w.a.p., mostly high-income, older generations, men, in the public sector, employees	**75%** of the w.a.p., mostly high-income, employees

Notes: PAYG = pay-as-you-go; FP = funded pensions; w.a.p. = working-age population. Cells in dark blue represent cases where the corresponding type of pension plan is mandatory. Cells in light blue represent cases where the corresponding type of pension plan is voluntary or conditional on certain requirements. Coverage rates are calculated as the proportion of working-age individuals who may receive the corresponding pension income source at retirement.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156838

Coverage rates may vary according to different socio-economic subgroups in the case of voluntary private pensions.[17] High-income individuals are generally more likely to be covered by a private pension plan than medium and low-income individuals.

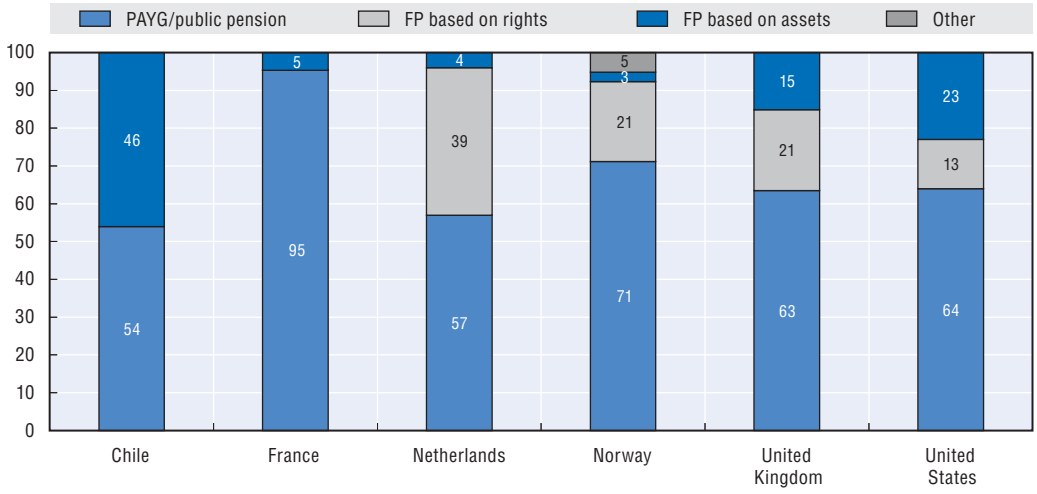
The population subgroups more likely to be covered change depending on the design of the private pension system. For instance, when a new system has been recently introduced, younger generations are more likely to be covered at retirement than older

generations because they have more time to enrol before retirement. This is the case for instance for occupational DC plans in France (PERCO plans introduced in 2003) and occupational DC plans in the United Kingdom (automatic enrolment into occupational pension plans introduced in 2012). While men are usually more likely to be covered than women, this may change when private pensions are more common in the public sector than in the private sector (for example occupational DB plans in Norway and in the United Kingdom).

State and public pensions may be the largest component of potential future pension income at retirement in all the countries studied. Figure 3.1 shows that, on average, the importance of state and public pensions in the pension income at retirement may be above 50% in the six countries covered. Public pensions may represent as much as 95% of total pension income at retirement in France, where private pensions are voluntary and not widespread. At the other extreme, in Chile, people who entered the labour market after 1st January 1981 have to participate in the funded DC system, but are not covered by any contributory PAYG pension system. Public pensions in that country represent a safety-net programme which complements the pension received from the DC system at least to up to the basic solidarity pension for people with a low DC pension.[18] Private pensions may have a greater importance in total pension income at retirement not only when they are mandatory (private pensions may represent 46% of total pension income in Chile, 43% in the Netherlands, 24% in Norway), but also when voluntary private pensions have a long standing history in the country (36% in the United Kingdom and in the United States).

Figure 3.1. **Average composition of potential pension income at retirement**

As a % of total pension income



Notes: PAYG = pay-as-you-go; FP = funded pensions. The category "Other" for Norway represents the collectively negotiated labour market pension system (AFP).
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156844

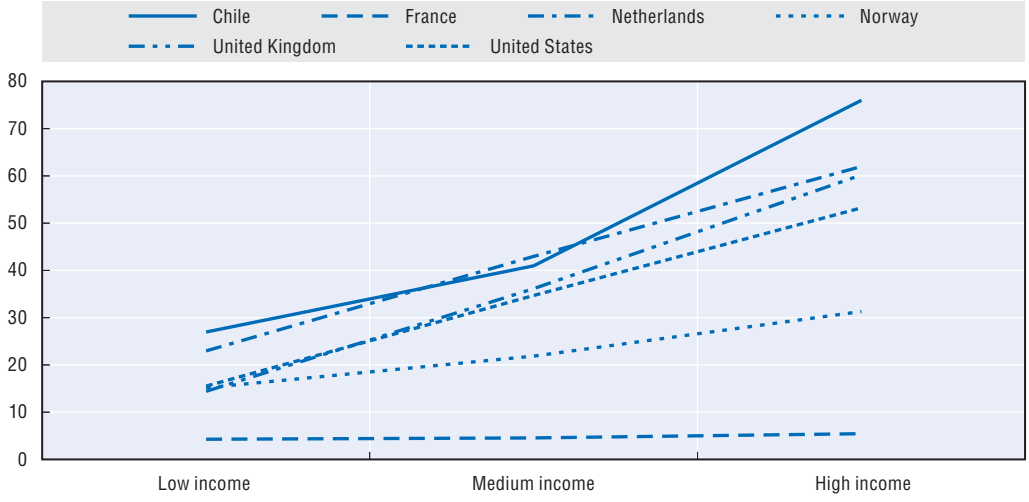
Aside from its mandatory nature, other characteristics of the private pension system can explain the relative importance of private pensions in total pension income, such as maturity and minimum contribution rate. For example, in Norway, even though occupational pensions are mandatory and DC plans may cover 42% of the working-age population, occupational DC pensions may only represent 3% of total pension income at

retirement on average in this country. Indeed, as occupational pension plans only became mandatory in 2006, only younger generations have the opportunity to build large pension pots at retirement. In addition, the mandatory contribution rate in DC plans is set at 2% of the salary. In the private sector, 58% of the workers are covered by such minimum arrangements. A large proportion of the population may therefore only accumulate small amounts of assets at retirement. Similarly, occupational DC pensions paid to members being automatically enrolled into an occupational pension plan (21% of the working-age population) may only represent 1% of total pension income in the United Kingdom on average. Automatic enrolment is indeed being staged in over a period of six years, which started with the largest employers in 2012. As in Norway, the minimum contribution rate has been set at 2% as a starting point (but it will reach 8% from 2018).

The importance of private pensions in total pension income may vary according to different socio-economic variables, in particular with the level of income. The importance of private pensions in total pension income may increase with income in the six countries studied (see Figure 3.2). They may even represent the main source of pension income for high-income individuals in Chile, the Netherlands, the United Kingdom and the United States.

Figure 3.2. **Average share of private pensions in total pension income at retirement, by level of income**

As a % of total pension income



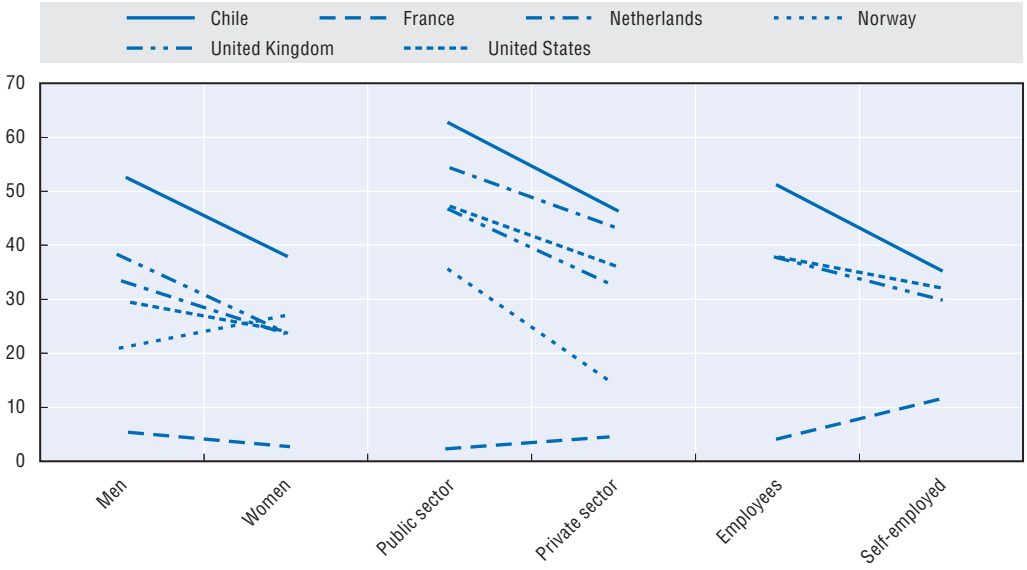
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156853

The importance of private pensions in total pension income may be greater for men than for women, except in Norway (see Figure 3.3). The gap between men and women with respect to private pension benefits usually originates from a gap in coverage rates and differences in earnings levels (as private pension benefits are always earnings-related). The gap in coverage between men and women can be explained, in some countries, by the fact that part-time workers (more often women) are less often enrolled in private pension plans than full-time workers.[19] In Norway, the coverage of occupational DB pensions is universal in the public sector. As women tend to work more often than men in that sector, they may rely more on private pensions than men at retirement.

Figure 3.3. **Average share of private pensions in total pension income at retirement by gender, sector and employment status**

As a % of total pension income



Notes: The breakdown by gender is only provided for single individuals for the Netherlands, the United Kingdom and the United States. Individuals not in employment at the time of the data collection are not included in the breakdown between public and private sector workers for Chile, the United Kingdom and the United States. They are also not included in the breakdown between employees and self-employed people for Chile and the United States.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156867

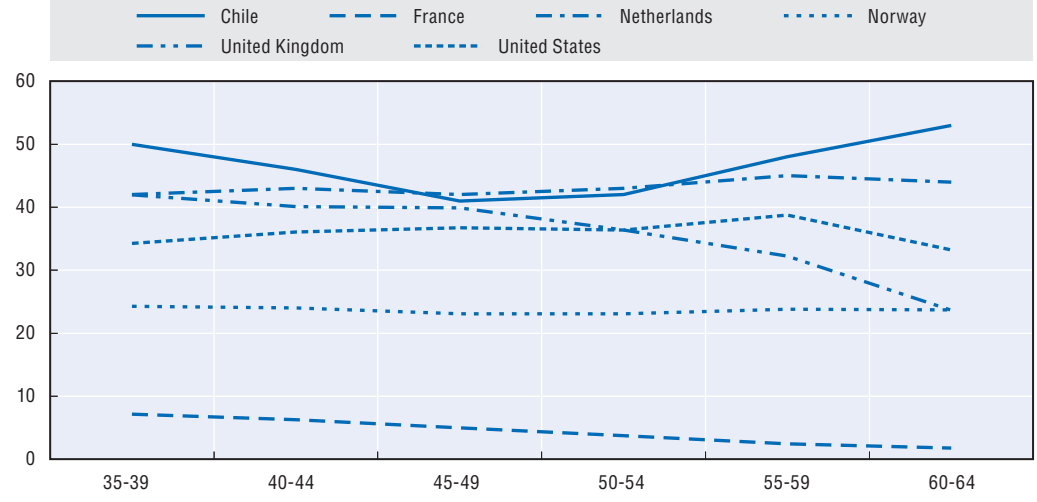
The importance of private pensions in total pension income at retirement may be greater for public sector workers than for private sector workers, except for France. In some countries, public sector workers have access to special private pension arrangements. This is the case in Norway, where occupational DB pension plans are mandatory in the public sector, and in the United Kingdom and the United States, where public sector workers are more often covered by occupational DB plans than private sector workers. In the Netherlands, access to private pension plans is similar in both sectors, but public sector workers may enjoy higher earnings during their career due to a relatively higher average educational level as compared to workers in the private sector (most low-skilled jobs in the public sector have been privatized over the last decade).[20] In contrast, in France, the expected growth of occupational DC plans for private sector workers (PERCO) may explain why private pensions may have a greater importance in total pension income at retirement for private sector workers.

The existence of specific private pension arrangements for self-employed people may help them complement their state pension. Figure 3.3 indeed shows that, in France, the importance of private pensions in total pension income for self-employed people is greater than for employees, thanks to the existence of a specific private pension arrangement which helps the self-employed complement their public pension. In contrast, self-employed people in the United Kingdom or in the United States do not have specific occupational private pension schemes. They only have access to personal pension plans to complement their public pension. This may explain why they may rely less on private pensions at retirement than employees. In Chile, participation in the DC pension system is voluntary for the self-employed.[21]

Finally, younger generations may be more likely than older generations to be covered by a private pension arrangement that has been recently introduced. As a consequence, younger generations may rely more on these arrangements at retirement. Figure 3.4 then shows that, in France and the United Kingdom, the importance of private pensions in total pension income may be greater for younger generations following the introduction of new plans or new features (automatic enrolment for example) in the private pension system. In Chile also, younger generations may rely more on private pensions at retirement. The model indeed projects a higher density of contributions for younger generations, who may then accumulate more and more assets in DC pension accounts. Cohort-specific effects may explain why DC pensions may also have a greater importance for older age groups (aged 55 to 64) in Chile: i) older workers today may have moved from the old public DB pension system to the new private DC pension system and received recognition bonds in their DC accounts to reflect their contributions to the old DB system; ii) workers who switched to the new DC system were younger and more educated than the average individual, thus they were also more likely to have more assets accumulated in their DC account; and iii) older workers have benefited from higher real rates of return than what younger workers enjoyed and also higher than the returns assumed for the future in the intermediate scenario. Finally, in the Netherlands, Norway and the United States, the importance of private pensions may be constant across generations. In Norway and the United States, DB and DC pensions may however evolve in different directions, with occupational DB pensions having a greater importance for older generations and DC pensions (occupational and personal) having a greater importance for younger generations.

Figure 3.4. **Average share of private pensions in total pension income at retirement, by age group**

As a % of total pension income



Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156874

3.2.3. Would working-age individuals have a present value of pension income at retirement above certain current poverty thresholds?

This subsection compares the present value of potential pension income at retirement of working-age individuals with current measures of poverty. As the purpose of the analysis is to assess the proportion of people with pension income above different thresholds, this subsection uses current measures of poverty as a threshold to determine whether the present value of pension income alone may already put individuals above a certain poverty threshold at retirement. It is important therefore to stress that the indicator used in this subsection ***is not*** a poverty rate as it does not take into account social transfers which are not old-age related, or any other sources of income that people may have or tap into to finance retirement. In addition, the analysis does not project poverty thresholds into the future. It discounts future potential pension income of working-age individuals and compares it with a current measure of poverty.

The measure of poverty varies across countries. The poverty measure can be an absolute measure to identify if people are living above a minimum income needed to avoid extreme hardship. The poverty measure can also be relative. This relative measure of poverty identifies the extent to which there is inequity between individuals. People getting further and further away from the median income are considered poor as they get increasingly disenfranchised. Countries like Chile, the Netherlands and the United States use an absolute measure of poverty. In both Chile and the United States, this measure is adjusted every year for inflation, while in the Netherlands it is adjusted for wage growth. Countries like France and the United Kingdom use a relative measure of poverty. In these two countries, the poverty line threshold corresponds to 60% of the median equivalised population income. There is no official poverty threshold in Norway.

In both Chile and the Netherlands, social assistance fully protects pensioners from poverty, as defined in these countries. In the Netherlands, social assistance benefits complement pensioners' income up to the social minimum (EUR 1 000 per month in 2010 terms) if they have incomplete public pension entitlements and low amounts of occupational pension and wealth.[22] As the social minimum corresponds to the official Dutch poverty line, pensioners cannot have an income below that threshold.[23] In Chile, the system allows all pensioners to retire with a pension income above the poverty line, as people with a DC pension below a certain income threshold can claim solidarity benefits to complement their DC pension at least up to the basic solidarity pension, the level of which is above the poverty line.[24, 25] In France, the United Kingdom and the United States, working-age individuals at retirement may have a present value of pension income below their current country-specific poverty threshold.

Measuring poverty in relative terms, using the OECD threshold corresponding to 50% of the median equivalised population income, may lead to a threshold harder to attain in Chile and the United States. In these countries, the proportion of working-age individuals who may have a present value of pension income below a current measure of poverty is larger when poverty is measured in relative terms than in absolute terms. The opposite result is observed for France and the United Kingdom, as country-specific poverty thresholds are more binding than the OECD threshold. In the Netherlands and Norway, the present value of pension income for most working-age individuals may be above the OECD current measure of poverty.

In all the countries studied, the proportion of people that may have a present value of pension income below a current measure of poverty (using either the country-specific measure or the OECD measure of poverty) is higher for low-income people, women, private sector workers and self-employed people. For Chile, these population subgroups usually have lower earnings and lower density of contributions during their career than high-income people, men, public sector workers, and employees respectively. For the other countries, the groups of people most at risk of having a present value of pension income below a current measure of poverty usually rely less on private pensions at retirement, although this rule has some exceptions. For example, private pensions may have a greater importance in total pension income of self-employed people in France, but they may still be more likely to have a present value of pension income below the current poverty line than employees.

One would expect that, other things being equal, younger generations would be less at risk of having a present value of pension income below a current measure of poverty than older generations, especially when the complementary role of private pensions is expected to become more important over time. However, other factors, such as reductions in public pension benefits (resulting, for example, from reforms implemented to address financial sustainability problems – see Chapter 2) may affect this. The analysis below shows that the initial expectation may not be validated in all the countries studied, especially in France and the United States.

In the United Kingdom, people aged 60 to 64 may be at greater risk of having a present value of pension income below a current measure of poverty. They may be worse-off than other age groups because they are less likely to complement their state pension with private pension income. Other age groups may have a comparable risk of having a present value of pension income below the current poverty line.

In Chile, the trend of a decreasing proportion of individuals at risk of having a present value of pension income below a current measure of poverty line for younger generations is observed, as expected, but only for the age groups between 35 and 49. The opposite trend is actually observed for the older generations. This could be related to the cohort-specific effects mentioned earlier that older workers who switched to the new DC system have specific characteristics (including the fact that they may have received recognition bonds in their DC accounts to reflect their contributions to the old DB system) and have benefited from higher real rates of return than what younger workers enjoyed and also higher than the returns assumed for the future in the intermediate scenario.

In France, younger generations may be more likely to have a present value of pension income below a current relative measure of poverty than their elders despite the expected growing role of occupational DC plans. Reforms to the public pension system may explain this. Since the reform of 1993, benefits are calculated based on the best 25 years of the career, with past salaries revalued in line with prices. This means that part of the increases in purchasing power obtained during the career are removed for the calculation of the pension. If younger generations enjoy higher growth during their career than their elders (the intermediate scenario assumes a constant yearly aggregate productivity growth of 1.5%), the gap between their wages and their pension will widen and their pension will be worth less relatively to the one of their elders. In addition, since the reform of 2003, the length of the contribution period needed to get a full rate state pension evolves in parallel with gains in life expectancy. In the intermediate scenario for France, some people may retire before having contributed up to the full rate.[26] As younger generations are expected

to live longer, they may be more likely to receive a public pension calculated on a reduced rate. Finally, reforms of the complementary public regimes can also have a greater impact on younger generations. To balance the accounts of these regimes, trade unions agreed to lower the revaluation of the point value used to calculate benefits. The analysis herein assumes that it only evolves in line with prices minus 1 percentage point as of 2013 (without decreasing in absolute value). As younger generations will retire further in the future, the value of their complementary public pension will be worth less relative to the one of generations retiring sooner.

In the United States as well, younger generations may be at greater risk of having a present value of pension income below a current measure of poverty, especially when measured in relative terms. The rise in the official age of retirement from 65 to 67 may translate into lower state pension benefits if people continue to retire at 65 as is assumed in the intermediate scenario. For younger generations, retiring two years before the official age leads to a reduction of 13% of their state pension. Another reason why younger generations may be worse-off than their elders is the shift from occupational DB plans, where workers receive a life annuity based on years of service and final salary, to occupational DC plans, where workers themselves are responsible for their own saving. Data show that DC plans may provide a pension income at retirement less than half what DB plans may provide to people covered by such plans (under the assumption of returns on investment equal to 3.5% going forward). This can be due to the lower overall contribution rates to DC plans as compared to DB plans.

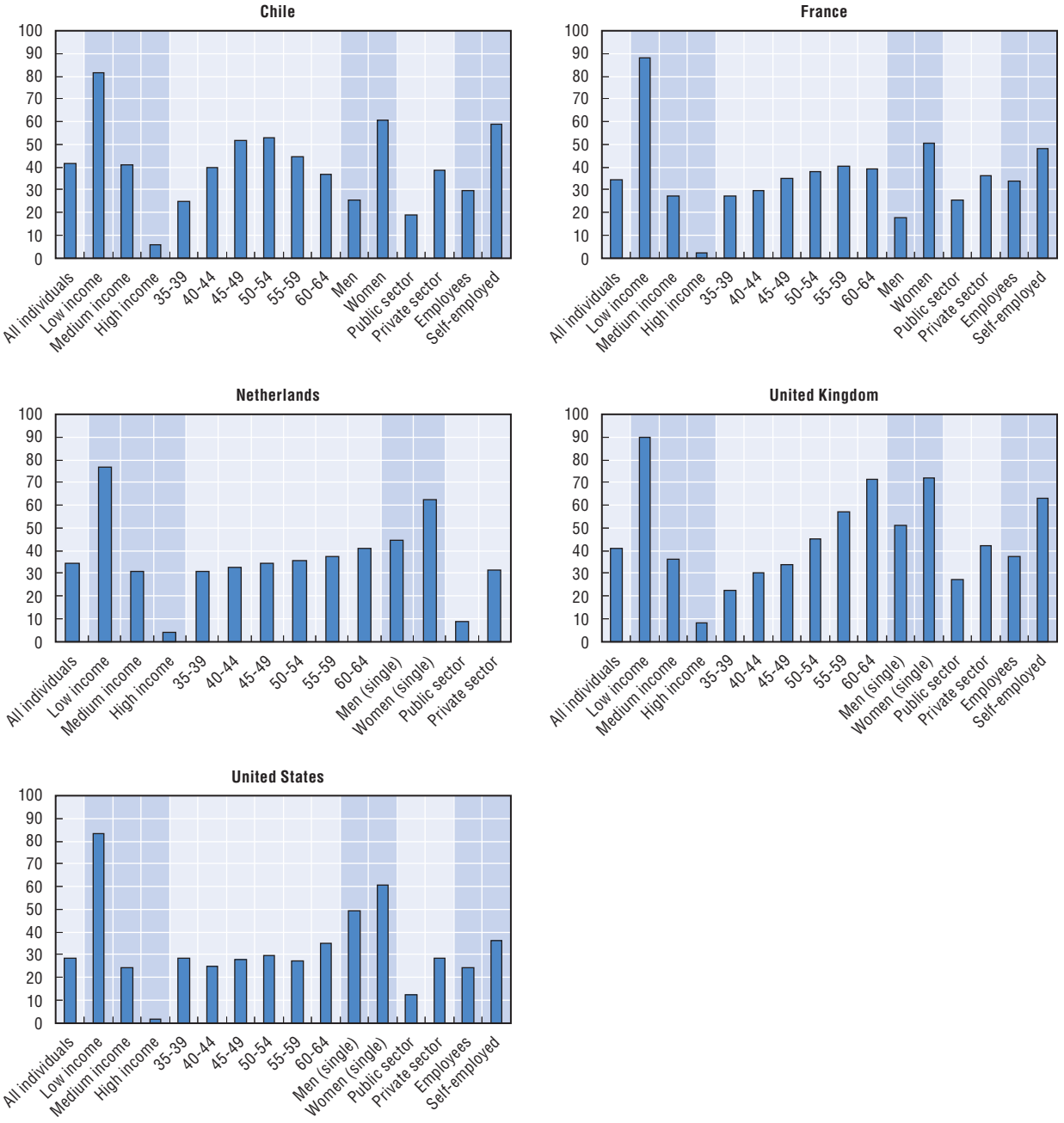
3.2.4. Would working-age individuals have sufficient pension income at retirement to be at least as well-off as the cohort already retired?

Depending on the country, between 29% and 42% of working-age individuals may have a present value of pension income at retirement lower than the average pension income of current retirees, those who left the labour market recently. It is interesting to note, from looking at Figure 3.5, that trends are similar across socio-economic subgroups in the five countries with available information. In Chile, France, the Netherlands, the United Kingdom and the United States, subgroups of the population that are the most likely to have a present value of pension income below the one that recent retirees currently receive are low-income individuals, older generations (except for Chile due to cohort-specific effects), women, private sector workers and self-employed people. Because comparisons are done in real terms, this indicates as well that these population subgroups may have a lower purchasing power at retirement than others (medium and high-income individuals, younger generations, public sector workers and employees respectively).

The fact that younger generations of working-age individuals have a lower risk of having a present value of pension income below the one of current retirees than older generations primarily reflects the fact that working-age individuals will be living in a wealthier society as time goes by. For example, in the United Kingdom, 23% of the individuals aged 35 to 39 may have a present value of pension income lower than the average pension income of current retirees, as compared to 72% for individuals aged 60 to 64. The intermediate scenario assumes an aggregate productivity growth of the economy of 1.5% per year. At the same time, pension benefits of current retirees usually only grow with inflation in most countries. Younger individuals will therefore accumulate pension rights in a society that will be wealthier as time goes by, as compared to the one in which current retirees have

Figure 3.5. **Working-age individuals with potential pension income at retirement below recent retirees' average pension income**

In per cent



Notes: The comparison of pension income between working-age individuals and current retirees is in real terms. Individuals not in employment at the time of the data collection are not included in the breakdown between public and private sector workers for Chile, the United Kingdom and the United States. They are also not included in the breakdown between employees and self-employed people for Chile and the United States.

Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156882

lived in. Their pension income at retirement is therefore less and less likely to fall below the one of current retirees, which will only evolve with inflation in the future.

3.2.5. Would working-age individuals have sufficient pension income at retirement to maintain a certain level of their standard of living?

The analysis uses three different measures of replacement rates to assess whether working-age individuals might have sufficient pension income at retirement to maintain a certain level of their standard of living at retirement. The replacement rate is defined as the ratio between gross pension income at retirement and gross pre-retirement earnings. The analysis uses three measures of pre-retirement earnings: final earnings, inflation-indexed career-average earnings and wage-indexed career-average earnings.

Table 3.2 shows that working-age individuals may generally reach a lower replacement rate at retirement when measured with respect to final earnings rather than career-average earnings. For France, Norway and the United Kingdom, the median final earnings replacement rate is lower than the median wage-indexed career-average earnings replacement rate. This may reflect the fact that most people in these countries experience the largest gains in real wages during the early part of their career, with lower gains in the later part of their career. With such a path, final earnings are larger than wage-indexed career-average earnings, leading to an inverse relationship for replacement rates. In Chile, the Netherlands and the United States, the median final earnings replacement rate is greater than the median wage-indexed career-average earnings replacement rate. This may reflect negative gains in earnings in the later part of some people's career, potentially bringing final earnings below wage-indexed career-average earnings. This can happen for example if people reduce working hours in the later part of their career.[27] Finally, inflation-indexed career-average earnings are usually lower than wage-indexed career-average earnings as it is easier to keep the same purchasing power over time than to keep the same relative position in the income scale. Median replacement rates are therefore inversely related in most countries.

Table 3.2. **Median replacement rates at retirement for different definitions of pre-retirement earnings**

In per cent

Country	Final earnings replacement rate	Wage-indexed career-average earnings replacement rate	Inflation-indexed career-average earnings replacement rate
Chile	55	50	55
France	63	82	95
Netherlands	71	67	67
Norway	61	67	..
United Kingdom	75	83	114
United States	61	58	71

Note: These replacement rates are complementary to the ones published in the OECD *Pensions at a Glance* series and differ from them in various aspects, as it is described in subsection 3.A1.11 in the Annex 3.A1. For the United Kingdom, these rates compare well with a recent research from the Institute for Fiscal Studies (see Crawford and O'Dea, 2012).
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156898

The results shows that the proportion of people that may fail to retire with a pension income replacing 54% of their final earnings varies significantly across the selected OECD countries (see Table 3.3). Only around 20% of working-age individuals in France, the

Netherlands and the United Kingdom may fail to retire with a pension income replacing 54% of their last wage. At the other extreme, in Chile, 49% of working-age individuals may fail to reach a replacement rate of 54%. This proportion is around 30% in Norway and 40% in the United States.

Table 3.3. **Working-age individuals with replacement rate below a reference rate**

In per cent

Country	Common reference replacement rate	Proportion of individuals with RR < 54%	Country-specific reference replacement rate	Proportion of individuals with RR < country's reference
Chile	54% of final earnings	49	None	
France		21	66% of final earnings	61
Netherlands		19	70% of career-average earnings	58
Norway		30	66% of final earnings	64
United Kingdom		20	50% to 80% of final earnings	36
United States		40	None	

Notes: RR = replacement rate. The 70% reference replacement rate for the Netherlands is based on wage-indexed career-average earnings. For the United States, this result compares well with other studies aiming at assessing retirement income preparation in the country, although methodologies are different (see Munnel et al., 2012 and VanDerhei and Copeland, 2010).
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156909

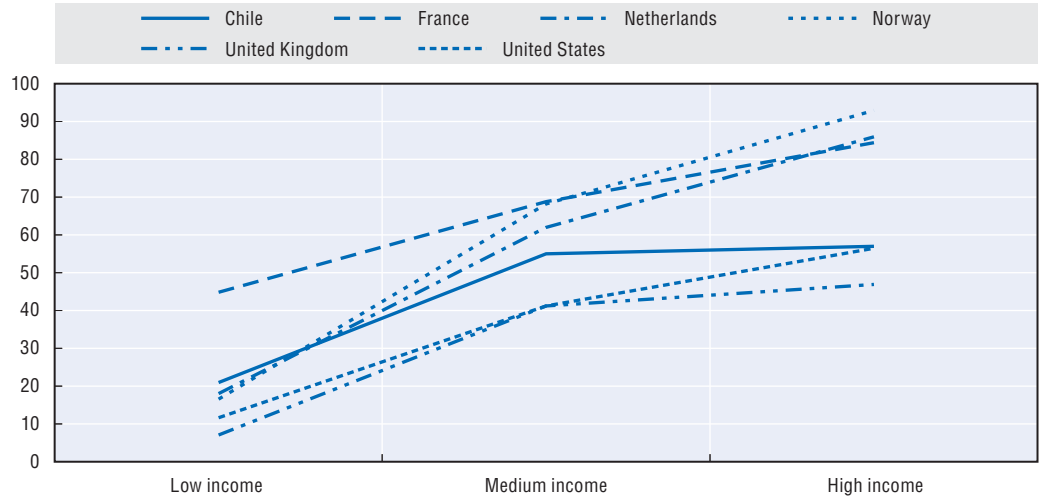
Using a common reference replacement rate of 54% for different countries may however not fully reflect the various objectives of their pension systems. Some countries actually define another implicit or explicit reference. The structure and objectives of each pension system are indeed specific and may reflect different old-age expenditure needs. For example, the reference replacement rate may need to be set at a higher level in countries where the state does not cover health expenses for pensioners than in countries where the state does cover such expenses. Table 3.3 shows that Norway and France use as a reference two-thirds of final earnings.[28] The pension system in the Netherlands aims at providing a total pension (state pension plus occupational mandatory pension) equivalent to 70% of wage-indexed career-average earnings.[29] In the United Kingdom, the Pensions Commission 2004 defined different replacement rate benchmarks for different income levels. They used benchmark replacement targets of 80% of gross earnings for lowest earners, declining to 67% for median earners and to 50% for top earners. In contrast, there is no explicit benchmark replacement rate nor a consensus implicit benchmark replacement rate that the US government uses for the combination of public pensions provided by the social security and the private-sector voluntary retirement benefits provided by the occupational system and individual private savings.[30] There is no reference replacement rate for Chile either, as it is a DC system that does not guarantee a minimum rate of return.

The proportion of people that may fail to reach a reference replacement rate still varies significantly across the countries studied when using country-specific reference replacement rates. It varies from 36% in the United Kingdom to 64% in Norway.[31] For all countries with available information, reaching the country-specific reference replacement rate may prove more difficult for working-age individuals than reaching a 54% reference. The risk of not reaching the reference when using a country-specific benchmark increases by 16 percentage points for the United Kingdom, 34 percentage points for Norway, 39 percentage points for the Netherlands and 40 percentage points for France.

Thanks primarily to the progressivity of state pensions, medium and high-income individuals may be more likely than low-income individuals to have a replacement rate at retirement below the country-specific reference replacement rate.[32] Figure 3.6 shows that this is the case as state pensions provide generally higher replacement rates for low-income individuals.[33] Examples of progressive programmes include safety-net benefits (found in all countries), minimum pensions (as in France and Norway) and flat rate state pensions (as in the Netherlands and the United Kingdom). Although medium and high-income individuals may have lower replacement rates, they have higher benefits in absolute terms (as demonstrated by the indicator calculating the proportion of people that may retire with a pension income below the poverty line and by the comparison with current retirees). More than half of medium-income individuals in Chile, France, the Netherlands and Norway may fail to reach their country-specific reference replacement rate for example.

Figure 3.6. **Working-age individuals with replacement rate below country's reference rate, by level of income**

In per cent



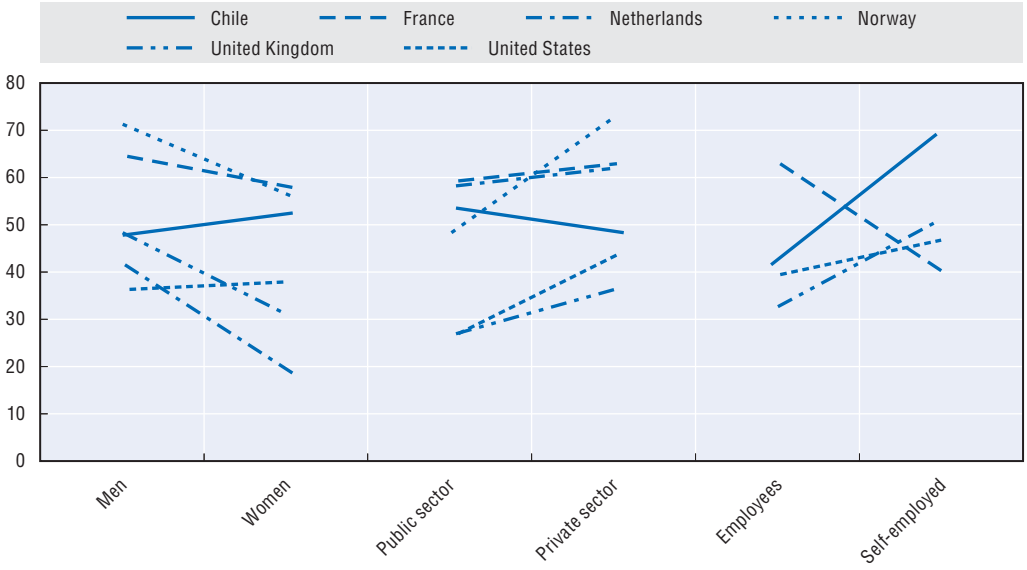
Note: For Chile and the United States, the numbers represent the proportion of working-age individuals with a replacement rate below the OECD average rate of 54%, as there is no country-specific reference replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156911

Men may be more at risk than women of failing to reach a reference replacement rate, except in Chile and the United States (Figure 3.7). The main factor is related to differences in earnings levels across genders. As women tend to be more often on low earnings during their career than men, they can get the most of the generosity of the state pension system through safety-net programmes or minimum pensions, and therefore reach higher replacement rates at retirement. As already mentioned, the fact that men may have lower replacement rates at retirement does not mean that they may have lower benefits in absolute value. The two previous indicators have indeed shown that men may enjoy higher benefits than women on average. These benefits however may replace a lower share of their pre-retirement earnings. In Chile, the pension system is less progressive as DC pensions represent a large share of pension income. Men, who tend to be higher earners, can therefore reach higher replacement rates than women and pass the 54% benchmark more easily.

Figure 3.7. **Working-age individuals with replacement rate below country's reference rate, by gender, sector and employment status**

In per cent



Note: For Chile and the United States, the numbers represent the proportion of working-age individuals with a replacement rate below the OECD average rate of 54%, as there is no country-specific reference replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156929

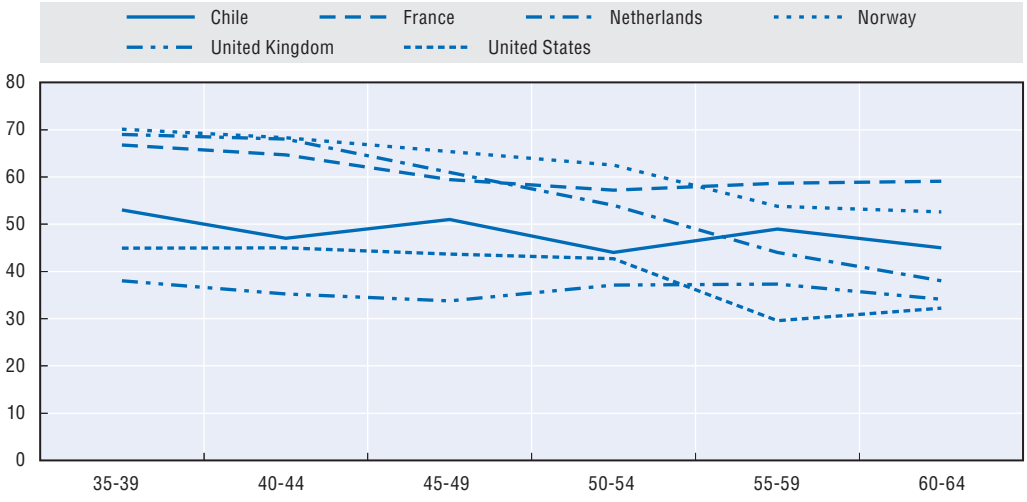
In Norway, the United Kingdom and the United States, private sector workers may have more difficulties in reaching their country-specific reference replacement rate than public sector workers. In these countries, as already discussed in subsection 3.2.2 (Figure 3.3), private pensions may have a greater importance in total pension income at retirement for public sector workers than for private sector workers. Occupational DB pensions are indeed mandatory for public sector workers in Norway, while in the private sector, workers may be covered by an equivalently generous DB pension plan or by a DC pension plan with a minimum 2% contribution rate. In the United Kingdom and the United States, DB plans are also more widespread among public sector workers. In these three countries, DB pensions may provide a better complement to public pensions, leading to larger replacement rates for public sector workers.

When the self-employed do not have access to specific occupational private pension plans to complement their public pension, they may be more at risk than employees of failing to reach a reference replacement rate. This is the case in the United Kingdom and the United States, where the self-employed can only use personal pension plans to complement their state pension. In Chile, participation in the DC pension system is, at the time of the calculations, voluntary for the self-employed. Conversely, in France, the self-employed may make a greater use of private pensions to complement their public pension benefits and enjoy higher replacement rates at retirement than employees. This is facilitated by the fact that they have their own occupational private pension arrangement.

Finally, younger generations may be more at risk of failing to reach their country-specific reference replacement rate in Chile, France, the Netherlands, Norway and the United States. In Chile, although younger generations may contribute more years into the system than their elders, they may not enjoy the same performance on their DC accounts.[34] While the system has delivered so far an average real rate of return of 9% according to the Chilean Superintendence of Pensions, the intermediate scenario assumes that it will only be 3.5% going forward. Younger generations may therefore spend more time in a less performing system, leading to lower pensions and lower replacement rates. In France, private pensions do not seem to grow enough to offset the impact of the indexation rules in the public pension system and the increase in the length of the contribution period needed to get a full rate state pension. Younger generations in the United States may also suffer lower replacement rates at retirement than their elders due to the increase of the official age of retirement to 67 and the shift of occupational pension provision from DB to DC plans.

Figure 3.8. **Working-age individuals with replacement rate below country's reference rate, by age group**

In per cent



Note: For Chile and the United States, the numbers represent the proportion of working-age individuals with a replacement rate below the OECD average rate of 54%, as there is no country-specific reference replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156937

In the Netherlands, there are four main factors that may explain the potential deterioration of replacement rates for future generations. First, the maximum tax favoured pension accrual rate in occupational DB plans is planned to decrease from 2.25% in 2013 to 1.875% in 2015. Second, most DB schemes shifted from final-pay DB plans to career-average DB plans after 2003. Third, the analysis only assumes a 50% price indexation of accrued rights in the intermediate scenario, due to the current difficult

financial position of Dutch DB pension funds. Finally, from 2014, all occupational pension plans have to assume a standard pension age of 67. This means that people retiring at 65 will get reduced benefits.

In Norway, younger individuals may also be more likely to have lower replacement rates than their elders, for two main reasons: i) they tend to be in industries less often covered by collective agreements and DB pensions, and ii) they have to bear the cost of longer life expectancies. Regarding the second point, future improvements in life expectancy have an impact on both public and DC pensions. Public pensions are adjusted downwards as the number of years expected to be spent in retirement increases. DC pensions are impacted through the conversion of assets accumulated at retirement into a life annuity (a higher life expectancy at retirement will lower the level of the annuity payment). If younger generations do not delay retirement to compensate for longer life expectancy, they will receive lower benefits than older generations and fall in the income distribution.

In the United Kingdom, several factors may play in different directions to explain the trend of replacement rates across age groups. First, cohort-specific effects (higher participation rates in the labour market for younger generations) may translate into higher replacement rates at retirement for younger generations (and therefore a lower risk of failing to reach the reference replacement rate). Second, private pensions may have a greater importance in total pension income at retirement for younger generations, as already shown in subsection 3.2.2 (Figure 3.4). The complementary role of private pensions may therefore be reinforced for younger generations and help increasing or maintaining replacement rates. These effects seem to balance other factors that may deteriorate replacement rates for future generations, especially from public pension plans. In the United Kingdom, the increase in the State Pension age may translate into lower state pension benefits for younger generations if they do not delay retirement and continue to leave the labour market as people currently do.

3.2.6. Potential impact of housing wealth on retirement income

This subsection looks at the potential complementary role of housing wealth in the retirement readiness of working-age individuals. It uses data for the Netherlands, the United Kingdom and the United States to illustrate this potential impact. In particular, it looks at the impact of adding to the previously calculated potential pension income the annuity payments obtained from converting housing equity into a stream of income.

In the three countries, housing wealth may be an important complement to pension income to finance retirement years for many people. Indeed, a large proportion (83% in the United Kingdom, 80% in the United States and 65% in the Netherlands) of working-age individuals may own (outright, partially or with the help of a mortgage) their home. Adding the income that people could extract from their housing wealth to the potential pension income at retirement may therefore have an important impact on the retirement readiness of many individuals.

The possibility of taping one's housing wealth to help finance retirement may reduce the proportion of people with insufficient retirement income substantially. Indeed, assuming that people could use at retirement the value of their home to get an

annuity that pays them a constant stream of income for life (i.e. convert their housing equity into an annuity), the proportion of individuals at risk of failing to maintain their standard of living at retirement (using the 54% benchmark) drops by 16 percentage points to 24% for the United States, by 14 percentage points to 6% for the United Kingdom, and by 12 percentage points to 7% for the Netherlands (see Table 3.4). The annuity payments would represent 16% of total retirement income in the United States, 18% in the Netherlands and 28% in the United Kingdom.

Table 3.4. **Potential impact of housing wealth on retirement income in the Netherlands, the United Kingdom and the United States**

In per cent

		Proportion of individuals with a final earnings replacement rate below 54%	Share of annuity payments from housing in total retirement income
Netherlands	Pension income	19	0
	Pension income + annuity	7	18
United Kingdom	Pension income	20	0
	Pension income + annuity	6	28
United States	Pension income	40	0
	Pension income + annuity	24	16

Source: *Source:* Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156943

3.2.7. Population subgroups relying less on private pensions at retirement and those at greatest risk of having low pension income

This subsection summarises the previous results. It first identifies the potential importance of private pensions in total pension income for different population subgroups. Second, it assesses which population subgroups are more at risk of having a present value of pension income below the average pension income of current retirees, or of having a replacement rate below a country-specific benchmark (or 54% of final earnings when such a benchmark does not exist). Table 3.5 summarises all of this and uses a colour coding with different shades of grey representing the range of situations regarding the importance of private pensions in total pension income at retirement, from less than 10% (in white) to more than half (dark grey). Different colours from white to dark blue represent the range of situations regarding the proportion of the working-age population that may have a low pension income (below the previously cited thresholds). White cells represent situations when less than 10% of the working-age population may have a low pension income. Dark blue cells represent situations when more than half of the working-age population may have a low pension income. Other nuances represent intermediate situations. The results are shown for the intermediate scenario.

Table 3.5. **Importance of private pensions and share of working-age individuals at risk of having a low pension income according to two indicators**

	Importance of private pensions in total pension income	Proportion worse-off than current retirees	Proportion below country-specific replacement rate benchmark
		CHILE	
All individuals	40%-49%	40%-49%	40%-49%
Low income	20%-29%	≥ 50%	20%-29%
Medium income	40%-49%	40%-49%	≥ 50%
High income	≥ 50%	< 10%	≥ 50%
35-39	≥ 50%	20%-29%	≥ 50%
40-44	40%-49%	40%-49%	40%-49%
45-49	40%-49%	≥ 50%	≥ 50%
50-54	40%-49%	≥ 50%	40%-49%
55-59	40%-49%	40%-49%	40%-49%
60-64	≥ 50%	30%-39%	40%-49%
Men	≥ 50%	20%-29%	40%-49%
Women	30%-39%	≥ 50%	≥ 50%
Public sector	≥ 50%	10%-19%	≥ 50%
Private sector	40%-49%	30%-39%	40%-49%
Employees	≥ 50%	30%-39%	40%-49%
Self-employed	30%-39%	≥ 50%	≥ 50%
		FRANCE	
All individuals	<10%	30%-39%	≥ 50%
Low income	<10%	≥ 50%	40%-49%
Medium income	<10%	20%-29%	≥ 50%
High income	<10%	< 10%	≥ 50%
35-39	<10%	20%-29%	≥ 50%
40-44	<10%	30%-39%	≥ 50%
45-49	<10%	30%-39%	≥ 50%
50-54	<10%	30%-39%	≥ 50%
55-59	<10%	40%-49%	≥ 50%
60-64	<10%	40%-49%	≥ 50%
Men	<10%	10%-19%	≥ 50%
Women	<10%	≥ 50%	≥ 50%
Public sector	<10%	20%-29%	≥ 50%
Private sector	<10%	30%-39%	≥ 50%
Employees	<10%	30%-39%	≥ 50%
Self-employed	10%-19%	40%-49%	40%-49%
		NETHERLANDS	
All individuals	40%-49%	30%-39%	≥ 50%
Low income	20%-29%	≥ 50%	10%-19%
Medium income	40%-49%	30%-39%	≥ 50%
High income	≥ 50%	< 10%	≥ 50%
35-39	40%-49%	30%-39%	≥ 50%
40-44	40%-49%	30%-39%	≥ 50%
45-49	40%-49%	30%-39%	≥ 50%
50-54	40%-49%	30%-39%	≥ 50%
55-59	40%-49%	30%-39%	40%-49%
60-64	40%-49%	40%-49%	30%-39%
Men (single)	30%-39%	40%-49%	40%-49%
Women (single)	20%-29%	≥ 50%	10%-19%
Public sector	≥ 50%	< 10%	≥ 50%
Private sector	40%-49%	30%-39%	≥ 50%

	Importance of private pensions in total pension income	Proportion worse-off than current retirees	Proportion below country-specific replacement rate benchmark
		NORWAY	
All individuals	20%-29%		≥ 50%
Low income	10%-19%		10%-19%
Medium income	20%-29%		≥ 50%
High income	30%-39%		≥ 50%
35-39	20%-29%		≥ 50%
40-44	20%-29%		≥ 50%
45-49	20%-29%		≥ 50%
50-54	20%-29%		≥ 50%
55-59	20%-29%		≥ 50%
60-64	20%-29%		≥ 50%
Men	20%-29%		≥ 50%
Women	20%-29%		≥ 50%
Public sector	30%-39%		40%-49%
Private sector	10%-19%		≥ 50%
		UNITED KINGDOM	
All individuals	30%-39%	40%-49%	30%-39%
Low income	10%-19%	≥ 50%	<10%
Medium income	30%-39%	30%-39%	40%-49%
High income	≥ 50%	<10%	40%-49%
35-39	40%-49%	20%-29%	30%-39%
40-44	40%-49%	30%-39%	30%-39%
45-49	30%-39%	30%-39%	30%-39%
50-54	30%-39%	40%-49%	30%-39%
55-59	30%-39%	≥ 50%	30%-39%
60-64	20%-29%	≥ 50%	30%-39%
Men (single)	30%-39%	≥ 50%	40%-49%
Women (single)	20%-29%	≥ 50%	30%-39%
Public sector	40%-49%	20%-29%	20%-29%
Private sector	30%-39%	40%-49%	30%-39%
Employees	30%-39%	30%-39%	30%-39%
Self-employed	20%-29%	≥ 50%	≥ 50%
		UNITED STATES	
All individuals	30%-39%	20%-29%	40%-49%
Low income	10%-19%	≥ 50%	10%-19%
Medium income	30%-39%	20%-29%	40%-49%
High income	≥ 50%	<10%	≥ 50%
35-39	30%-39%	20%-29%	40%-49%
40-44	30%-39%	20%-29%	40%-49%
45-49	30%-39%	20%-29%	40%-49%
50-54	30%-39%	30%-39%	40%-49%
55-59	30%-39%	20%-29%	20%-29%
60-64	30%-39%	30%-39%	30%-39%
Men (single)	30%-39%	40%-49%	30%-39%
Women (single)	20%-29%	≥ 50%	40%-49%
Public sector	40%-49%	10%-19%	20%-29%
Private sector	30%-39%	20%-29%	40%-49%
Employees	30%-39%	20%-29%	40%-49%
Self-employed	30%-39%	30%-39%	40%-49%

Notes: Individuals not in employment at the time of the data collection are not included in the breakdown between public and private sector workers for Chile, the United Kingdom and the United States. They are also not included in the breakdown between employees and self-employed people for Chile and the United States. For Chile and the United States, the numbers represent the proportion of working-age individuals with a replacement rate below the OECD average rate of 54%, as there is no country-specific reference replacement rate.

Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156955

In Chile, private pensions may represent a significant part of total pension income at retirement. They may even represent the main source of pension income for high-income individuals, men, public sector workers and employees. Public pensions represent a complementary income that people have to claim when their DC pension is below a certain threshold. While working-age individuals may not retire with a pension income below the official poverty line in Chile, most of them may fail to reach a replacement rate benchmark of 54%. In addition, the risk of retiring with a pension income below current retirees' average pension income is greater for low-income individuals, middle-aged individuals, women, private sector workers and self-employed individuals than for other socio-economic subgroups.

In France, private pensions may have a marginal role in financing retirement. They may represent less than 10% of total pension income at retirement, except for the self-employed (13%). Despite higher replacement rates, low-income individuals may be at greatest risk of having a present value of pension income below current retirees' average pension income. Women, private sector workers and the self-employed may have a lower purchasing power at retirement than other socio-economic subgroups, as demonstrated by the proportion of individuals with an income below current retirees' average pension income. Most working-age individuals may fail to reach a benchmark replacement rate of 66% of final earnings.

In the Netherlands, private pensions may represent a significant part of total pension income at retirement. They may even represent the main source of pension income for high-income individuals and public sector workers. Most working-age individuals may fail to reach the benchmark replacement rate defined in the Dutch pension system (70% of career-average earnings). This may be even less likely for medium and high-income individuals, younger generations and men. Private sector workers may have a lower purchasing power at retirement than public sector workers.

In Norway, despite the mandatory nature of occupational pensions, private pensions may represent less than 30% of total pension income at retirement. This is because a large share of the population contributes very little to their occupational DC plans. Private pensions may be less important for low-income individuals and private sector workers as compared to other socio-economic subgroups. Most working-age individuals may fail to reach the implicit replacement rate set as a target for the Norwegian pension system (66% of final earnings).

In the United Kingdom, the importance of private pensions in total pension income may increase with income and may even exceed 50% for high-income individuals. Despite higher replacement rates, low-income individuals may be at greatest risk of having a present value of pension income below current retirees' average pension income. High-income individuals, single men and the self-employed may be more at risk of failing to reach the benchmark replacement rates set up by the Pensions Commission in 2004. Low-income individuals, single individuals, private sector workers and the self-employed may have a lower purchasing power at retirement than other socio-economic subgroups.

In the United States, the importance of private pensions in total pension income may increase with income and may even exceed 50% for high-income individuals. Despite higher replacement rates, low-income individuals may be at greatest risk of having a present value of pension income below current retirees' average pension income. Most working-age Americans may fail to reach a benchmark replacement rate of 54% of final

earnings, although this is not a benchmark commonly accepted in the United States. Low-income individuals and single individuals may have a lower purchasing power at retirement than other socio-economic subgroups.

3.2.8. Sensitivity analysis

This subsection looks at the impact that different economic conditions and different individual behaviour may have on the role that private pensions play in the retirement readiness of the working-age population. The analysis looks therefore at the impact of changes in inflation, aggregate productivity growth, rate of return on investments and discount rate (economic conditions) and the age of exit from the labour market (individual behaviour). The Annex 3.A2 provides summary tables for each scenario for each country.

The importance of DC pension plans in total pension income may increase when delaying retirement and/or when rates of returns are higher. Indeed, delaying retirement has a double positive impact on DC pensions: i) people have more time to accumulate assets and ii) the number of years in retirement that these assets need to finance is lower. Higher returns increase the pot of assets available to finance retirement. Conversely, if people retire early and/or suffer low returns on their investments during their career, the importance of DC pensions in their total pension income may be lower.

The importance of DB pensions in total pension income at retirement is sensitive to the assumptions in the Netherlands and in Norway. In the Netherlands, the importance of DB pensions may fall to 27% of total pension income if the economic conditions prevent pension funds to index accrued pension rights to inflation in DB plans (Table 3.A2.10 in the annex). On the contrary, when accrued pension rights are fully price indexed, DB pensions may represent up to 44% of total pension income on average (Table 3.A2.12 in the annex). In Norway, DB pensions may have a greater importance in total pension income when people retire early (at 62 if they are eligible). This is due to the structure of the early retirement scheme for public sector workers. This scheme, which is part of the occupational DB arrangement, pays the full pension benefit between the age of 62 and 67, while state pension only starts paying benefits from the age of 67. Table 3.A2.14 in the annex thus shows that, at retirement, the whole pension income of public sector workers is paid by the early DB retirement scheme in the pessimistic scenario. For private sector workers, the importance of DB pensions in total pension income may not change when retiring early.

Economic conditions and different individual behaviour in terms of labour market exit may have an impact on pension income levels and on the ability to maintain one's standard of living at retirement. Delaying retirement and living in a wealthier society (higher productivity growth and higher rates of return on investments in particular) lifts everyone up and therefore pushes down the proportion of working-age individuals at risk of having a present value of pension income below a current measure of poverty or below the average pension income of current retirees. Similarly, it pushes down the proportion of working-age individuals at risk of failing to maintain the same standard of living at retirement.

Failing to fully index accrued DB pension rights to inflation may create inequalities across generations in the Netherlands. Table 3.A2.12 in the annex shows that the importance of DB pensions in total pension income may be the same across generations (around 43-44%) when DB pension rights in occupational plans are fully indexed to prices.

The analysis also shows that, under these conditions, replacement rates from DB plans may be equal for all generations (around 36-37%). However, when DB pension rights are only partially indexed to inflation or not indexed at all, the importance of DB pensions in total pension income and the replacement rates from DB plans may start to fall for younger generations. For example, if future accrued rights in occupational pension plans are not indexed to inflation, DB pensions may only represent 24% of total pension income for people aged 35 to 39, as opposed to 34% for those aged 60 to 64 (see Table 3.A2.10 in the annex). Replacement rates may also fall, from 22% for those aged 60 to 64 to 11% for the younger age group. In addition, the risk of being worse-off than current retirees also increases for younger generations under such conditions.

Delaying retirement from 67 to 70 in Norway may allow younger individuals to fully or partially compensate for the loss in total pension income at retirement as compared to their elders due to the life expectancy risk transfer in the public pension system. The analysis shows that people born in 1975 but retiring at 70 instead of 67 may reach an average replacement rate (67%) in par with the one that people born in 1953 and retiring at 67 may get (70%).[35] People born in 1953 are indeed in the last age-group for which public pensions are calculated with the old rules, with a very mild transfer of the life expectancy risk to individuals. In contrast, younger individuals, born in 1965 or in 1975, fully support the life expectancy risk under the new pension system. They have to delay retirement to compensate for this risk transfer.

Younger generations in Chile and France may still be more likely to be at greater risk of failing to maintain their standard of living at retirement than their elders, even under more favourable economic conditions (see Tables 3.A2.4 and 3.A2.8 in the annex). For France, two of the three factors already identified earlier in this chapter can still explain why younger generations may be worse-off in terms of replacement rates in the optimistic scenario: i) past salaries are revalued in line with prices for the calculation of public pensions and ii) the point value used to calculate benefits from complementary public pension schemes is revalued below inflation. As the optimistic scenario assumes an aggregate productivity growth of 2% for France, the gap between final wages and public pension benefits (from the basic scheme and from complementary schemes) widens and the further away into the future people retire, the less their pension will be worth.[36] For Chile, a rate of return on investment of 6.1%, as assumed in the optimistic scenario, may not be sufficient for younger generations to catch-up with the average 9% return that older generations have enjoyed since the start of the system. They may therefore still lie behind their elders in terms of replacement rates.

In contrast, younger generations are the ones who may benefit the most of better economic conditions and of delaying retirement up to the official age in the United Kingdom and the United States. Indeed, Table 3.A2.20 in the annex shows that younger generations may have a lower risk of failing to maintain their standard of living at retirement than older generations under the optimistic scenario in the United Kingdom. This actually reflects higher replacement rates for younger people. These higher replacement rates are the result of stronger rates of returns for DC pension plans, which benefit more the younger generations as they may be more likely to join an occupational DC plan during their career through the automatic enrolment process. In addition, if people delay their retirement to leave the labour market at their State Pension age, this may also benefit younger generations the most. For example, if a man born in 1969 retires at his State Pension age, rather than at 65 as is currently observed in the United Kingdom,

he will contribute two more years (from 65 to 67) in the pension system, in particular in the additional State Pension scheme (S2P). As 65 is already the State Pension age for men born before 1953, they do not have to change their retirement behaviour to leave the labour market at their State Pension age and therefore do not get additional rights in the public pension system under the optimistic scenario. For the United States, Table 3.A2.24 in the annex shows that younger generations and their elders may have a similar risk of not reaching a benchmark replacement rate of 54% in the optimistic scenario. In this scenario, people can receive a full state pension as they all retire at their official age. In addition, younger generations can better enjoy a high performance on pension assets as they have more time to contribute in DC pension plans.

3.3. Policy options to strengthen the role of private pensions in financing retirement

OECD countries have implemented a range of policies to increase coverage in private pensions.[37] Following the OECD recommendation of diversifying the sources to finance retirement and having private pensions to complement public provision, several OECD countries have reformed their pension systems in order to encourage private pensions. Policies to increase private provision include compulsion, automatic enrolment, providing financial incentives and facilitating the access to private pension arrangements.[38] The countries covered in this analysis provide illustrations for these different policy options. Private pensions are mandatory in Chile (for employees), the Netherlands and Norway.[39] The United Kingdom has introduced automatic enrolment into occupational pension plans in 2012. Finally, France has a specific private pension arrangement to help self-employed people and farmers make personal retirement savings.

Making enrolment into private pensions compulsory is ultimately the most effective policy in achieving high and uniformly distributed levels of coverage (see OECD, 2012). In OECD countries, the difference in coverage rates between countries with mandatory and voluntary private pension systems is as much as 30 percentage points. Evidence from the behavioural economics and psychology literature that argues that individuals are bad at committing to save for retirement supports compulsory enrolment. Procrastination, myopia and inertia lead many individuals to postpone or avoid making commitment to save sufficiently for retirement even when they know that this is ultimately in their best interest.

There are however potential limits and disadvantages to compulsory enrolment that need to be considered. First, the main limit to compulsory enrolment is formal sector employment. It is very hard to get workers outside the formal economy and economically inactive individuals to contribute to any form of contributory pension arrangement. Second, making a system compulsory requires setting a specific contribution rate, which may be inefficient for some workers, especially if it forces them to become more indebted or divert funds from other necessary expenses such as educating children, or from investing in property or one's own business. Third, mandatory contributions to pensions may be perceived as a tax, discouraging people from working. Fourth, compulsory enrolment can lead to a ratcheting down effect, where existing provision is reduced if the target set by the government is lower than prevailing practice. Fifth, compulsory enrolment may not be necessary for all individuals, depending on the design of the overall pension system. Low-income workers for instance may not need to contribute in private pension plans if they already enjoy high replacement rates from the public pension system.

Automatic enrolment has gained popularity in recent years as an alternative to compulsory enrolment. It involves signing up people automatically to private pensions but giving them the option to opt out with different degrees of difficulty. The policy relies on individual behavioural traits such as inertia and procrastination. While it is recognised to have a positive impact on coverage, it does not guarantee a high level of coverage and its success depends on the design and the interaction with incentives in the system to ensure that people will not opt out in large numbers (see Chapter 4). Regulators need to carefully consider and define other aspects of the design of an automatic enrolment system, for example the target population, the financial incentives, the default contribution rate, the window for letting people opt out and re-enrol, and the possibility to take contribution holidays to achieve high and uniformly distributed levels of coverage.[40]

Moreover, the costs of establishing and managing an automatic enrolment system are likely to be higher than those associated with compulsion. For example, the administrative cost for employers of keeping track of the membership status of their employees when they have opted out and have to be re-enrolled should be considered, as well as the fiscal cost of providing financial incentives to encourage savings in private pension plans.

While achieving high participation rates in private pensions is a necessary condition to ensure an important role of private pensions in the financing of retirement, it is not sufficient. It should be associated with long contribution periods, high contribution levels and good performance of pension plan portfolios. Regarding the contribution level, the example of Norway is instructive. Despite the mandatory nature of occupational pension plans, occupational DC pensions may only represent 3% of total pension income at retirement. One reason hinges on the fact that the system is not mature yet, as occupational pension plans only became mandatory in 2006. But even for younger generations, DC pensions may only represent 4% of total pension income. This is the result of low contribution rates. As much as 58% of private sector workers may only have access to plans in which the employer contributes at the minimum 2% rate. Such a low contribution rate does not allow individuals to build large pension pots at retirement. It may even not be sufficient to offset the loss in public pensions for younger generations due to the life expectancy risk transfer.

Lengthening the contribution period, in particular by postponing retirement, leads to higher private pension benefits, especially in DC pension plans. Postponing retirement simultaneously increases assets accumulated to finance retirement and reduces the retirement period that those assets need to finance. The analysis shows that, for all the countries covered by this report, the importance of DC pensions in total pension income at retirement increases when moving to a more favourable scenario. This is mostly due to the combined effects of a delayed retirement and a higher performance on pension assets. This can however only be achieved if comprehensive measures that encourage or ensure high contributions for long enough periods are implemented. Such measures include labour market policies that promote job-creation at all ages and allowing people to have long contribution periods. Indeed, falling labour market participation rates for old-age workers in some countries may hinder some people's capacity to postpone retirement.

Private pension performance alone is also critical to ensure adequate benefits. Chile is a good illustration of the importance of investment returns on the pension income delivered by DC pension plans. Rates of return in Chile have averaged close to 9% since the start of the DC system. The rate of return assumed in the optimistic scenario of 6.1% is

more in line with the actual returns observed in Chile today. However, as Chile catches-up economically with developed economies, the rate of return should converge to the ones observed in these economies. If that happens, younger generations may be worse-off than their elders, even if they contribute for longer periods. A potential solution is to combine higher contribution rates and longer contribution periods.

Private pensions should be targeted to people that need them most. Self-employed individuals in particular may have a greater need than employees for better access to private pension arrangements. In many countries, self-employed individuals are excluded fully or partially from the mandatory pension system. For example, in the Netherlands, only employees can build rights into the occupational pension system.[41] In the United Kingdom, the self-employed cannot build additional State Pension rights (SERPS/S2P). The analysis herein shows however that, when they have access to specific private pension arrangements like in France, self-employed individuals may improve their situation at retirement, although this may not guarantee that they will enjoy the same purchasing power as employees.

There is a need to find a better alignment between public and private sector pensions, even in the private pension system. In some countries (e.g. France), the rules in calculating PAYG pension benefits differ between public and private sector employees, sometimes benefiting public sector workers. Even when the rules are the same in the PAYG pension system, in some countries, public sector workers tend to be more often covered by private pensions or to have more favourable arrangements than private sector workers. For example, in Norway, all public sector workers are covered by an occupational DB plan, while in the private sector, there is a mix of occupational plans offered to them, ranging from similarly generous DB plans to DC plans in which the employer only contributes at the 2% minimum rate. In the United Kingdom, all public sector occupational pension schemes are DB, and all DC occupational pension schemes are in the private sector. This situation could be difficult to understand by the general public, given that DB schemes are generally regarded as a better deal for members due to the pension promise the employer guarantees, while under DC schemes, risk is transferred to workers. The study also shows that, in the countries covered by the analysis, public sector workers may be better-off at retirement than private sector workers, in most dimensions of retirement readiness. There is therefore room to reform pension systems in certain OECD countries to allow all workers the same chance to have an adequate retirement income. This could be achieved by providing the same access for all types of workers to private pension arrangements and looking at innovative plan designs where risks can be shared between different stakeholders (employers, workers and pensioners).

3.4. Conclusions

This chapter has assessed the role of private pensions in the retirement readiness of working-age individuals in six OECD countries (Chile, France, the Netherlands, Norway, the United Kingdom and the United States). The chapter addresses four key policy questions using different indicators: Are people saving enough for retirement? Are private pensions fulfilling their complementary role in providing for retirement? Should policy makers introduce measures to increase retirement savings or to postpone retirement? Should these measures be targeted to specific population subgroups? The main results are summarised as follows.

The importance of private pensions in total pension income at retirement depends on several factors, including the mandatory or voluntary nature of individuals' enrolment into private pension plans, the incentives to enrol in a voluntary plan, the maturity of the private pension system, the level of contributions, the age of retirement and the economic environment. Private pensions have therefore a greater importance in the financing of retirement when high participation rates are associated with long contribution periods, high contribution levels and good economic conditions. When a new private pension system is introduced, the analysis shows that it takes time to have a significant impact on individuals' pension income, as only the younger generations may have the time to build large enough pension pots at retirement. Lengthening the contribution period, in particular by postponing retirement, leads to higher private pension benefits, especially in DC pension plans. Postponing retirement simultaneously increases assets accumulated to finance retirement and reduces the retirement period that those assets need to finance.

Differences in the role of social assistance may explain some of the differences observed in the proportion of people at risk of having a present value of pension income below a current measure of poverty across the countries covered by this analysis. In Chile, the Netherlands and Norway for example, the role of social assistance is very different from what is observed in other countries. In these three countries, social assistance fully protects pensioners from poverty by providing them with a minimum income at or above the poverty threshold. In France, the United Kingdom and the United States, social assistance only covers necessary living expenses.

In all the countries studied, the proportion of people that may have a present value of pension income below the current poverty line is higher for people on low income, women, private sector workers and self-employed people. In France, younger generations may be more likely to have a present value of pension income below a current relative poverty threshold than their elders due to reforms in the public pension system leading to benefit cuts. In the United States also, younger generations may be at greater risk of having a present value of pension income below a current measure of poverty, especially when the poverty line is defined using a relative measure. This may be due to the rise in the official age of retirement and the shift from occupational DB plans to occupational DC plans.

Depending on the country, between 29% and 42% of working-age individuals may have a present value of pension income at retirement lower than the average pension income of current retirees, those who left the labour market recently. Trends are similar across socio-economic subgroups in the five countries with available information. In Chile, France, the Netherlands, the United Kingdom and the United States, subgroups of the population that are the most likely to have a pension income below the one that recent retirees currently receive on average are low-income individuals, older generations (except for Chile due to cohort-specific effects), women, private sector workers and self-employed people. This reflects a lower purchasing power at retirement for these individuals as compared to other socio-economic subgroups.

Using country-specific reference replacement rates is more appropriate to compare how well working-age individuals may maintain their standard of living at retirement across countries with different pension systems. Medium and high-income individuals may be more likely than low-income individuals to have a replacement rate at retirement below their country-specific reference replacement rate. Men may be more at risk than women of failing to reach a reference replacement rate. In Norway and the United

Kingdom, private sector workers may have more difficulties in reaching their country-specific reference replacement rate than public sector workers. When the self-employed do not have access to specific occupational private pension plans to complement public pensions, they may be more at risk than employees of failing to reach a reference replacement rate. Finally, younger generations may be more at risk of failing to reach their country-specific reference replacement rate than their elders in Chile (due to lower rates of return on pension assets), the United States (due to the shift of occupational provision from DB to DC plans), France, the Netherlands and Norway (due to reforms leading to benefit cuts). In the United Kingdom, the risk is similar across generations.

Finally, the analysis shows that housing wealth may have a large impact on retirement income. However, it is not clear whether people will actually use this wealth to finance retirement, as other incentives may push people not to cash in their housing wealth (e.g. to leave the house as a bequest).

Notes

1. The OECD and its Working Party on Private Pensions launched a study to assess the role of private pensions in the retirement readiness of the working-age population in 2010. This chapter is the result of that study, which has benefited from the financial support of the European Union and Allianz Global Investors. The contents of this chapter are the sole responsibility of the OECD and can in no way be taken to reflect the views of the European Union.
2. The OECD Secretariat would like to thank the Chilean Superintendence of Pensions, the Observatoire de l'Epargne Européenne, Marike Knoef and Jim Been from Netspar, the Fafo research institute and Lillevold & Partners for providing the results for Chile, France, the Netherlands and Norway respectively, following the general framework agreed by the OECD Working Party on Private Pensions. Comments from Arne Magnus Christensen from the Norwegian Ministry of Labour and Social Affairs, Joseph Woods from the Department for Work and Pensions in the United Kingdom and Mark Iwry from the US Department of the Treasury are gratefully acknowledged.
3. This chapter only focuses on the role that private pensions can play in retirement readiness without discussing whether it may be better to promote public or private provision to address problems of sufficient retirement income. One of the main OECD messages (OECD, 1998) is to encourage diversification of sources to finance retirement and promote private pensions as a complement to public provision.
4. Annex 3.A1 provides the full description of the methodological framework followed by each country covered in the analysis.
5. The following data sources have been used for each country to assess the current situation of working-age individuals: the Social Protection Survey, the Administrative Database of Pension Histories and the Administrative Database of Affiliates, Contributors, Pensioners and Deceased for Chile; the Wealth Survey and simulations from the Destinie model for France; the "Dutch statistics on public pension entitlements", the "Dutch statistics on occupational pension entitlements" and the Dutch Income Panel data set for the Netherlands; income data from the Norwegian Labour and Welfare Service, the "Employee and employer register" and data on employers' affiliation to the collectively negotiated labour market pension system for Norway; the Wealth and Assets Survey for the United Kingdom; the Panel Survey of Income Dynamics for the United States.
6. Safety-net pension programmes are targeted to pensioners with low means. They are usually non-contributory and financed from the state general budget.
7. An example of hybrid pension plan is a cash balance plan in which benefits depend on a rate of return credited to contributions, where this rate of return is either specified in the plan rules, independently of the actual return on any supporting assets (e.g. fixed, indexed to a market benchmark, tied to salary or profit growth, etc.), or is calculated with reference to the actual return of any supporting assets and a minimum return guarantee specified in the plan rules.
8. These scenarios were agreed at the OECD Working Party on Private Pensions and between the participating countries. The most likely scenario for each country does not coincide exactly with any of the agreed scenarios.

9. For a full description of the scenarios, please refer to the common methodology in Annex 3.A1.

10. Minor deviations from these assumptions are described in each relevant country section contained in Antolin and Payet (2014).

11. The analysis uses the OECD-modified equivalence scale. This scale assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child. Other equivalence scales could be used, for example the square root scale.

12. The replacement rates calculated in this analysis are complementary to the ones published in the OECD *Pensions at a Glance* series and differ from them in various aspects (see subsection 3.A1.11 in the Annex 3.A1).

13. Subsection 3.A1.11 in the Annex 3.A1 provides a discussion on the relevance of each of the three approaches to calculate replacement rates.

14. Instruments currently available to convert housing equity into a stream of income are reverse mortgages with loan proceeds taken as fixed monthly payments. However, they differ with respect to the approach used here of getting a life annuity payment with the provider keeping the house after the annuitant passes away. In the reverse mortgage instrument, the individual can pay back the loan to the lender and keep the house. However, the amount of the loan is generally based on a small percentage of the value of the house (e.g. 20% to 50%).

15. In the case of the Netherlands, where the occupational pension system is quasi-mandatory, only individuals working as self-employed or in sectors not covered by collective agreements during their entire career will not build any entitlement in the occupational DB pension system.

16. This rather high percentage is mostly due to fiscally attractive rules for personal plans in the past. However, for a lot of people these plans provide only small pension benefits at retirement, as shown in Figure 3.1.

17. This is in line with a previous OECD study on private pension coverage, see OECD (2012).

18. The analysis assumes that all eligible individuals claim solidarity benefits. Although actual data show a take-up rate noticeably below 100% since the new solidarity pillar was introduced in 2008, the analysis assumes that in the long-term all eligible individuals will claim such benefits as they get familiar with the new system. People may not claim their solidarity benefits because of a lack of knowledge, although the Chilean authorities argue that the population has been widely informed when the new solidarity pillar was introduced. The amount of personal and family information that needs to be disclosed may also restrain some people from claiming their benefits.

19. See chapter 4, OECD (2012).

20. The analysis mostly identifies civil servants working for the central government as public sector workers for the Netherlands.

21. Since 2012, self-employed people are automatically enrolled in the DC system, with the option to opt-out. Contributions should become mandatory for the self-employed as of 2015. The analysis however does not take into account the effects of this reform on the coverage rate for the self-employed and keeps the pre-reform rates constant.

22. The analysis shows that only 3% of working-age individuals may receive social assistance benefits at retirement to complement incomplete public pension entitlements (mostly first-generation immigrants).

23. Actually, some individuals may have a pension income at retirement below the poverty line if they have incomplete public pension entitlements and too much wealth to receive social assistance benefits. When taking into account their total income (*i.e.* including wealth) these individuals do not live in poverty.

24. This threshold is called maximum pension with solidarity supplement (PMaS). In addition, individuals must belong to the 60% poorest population group to claim a publicly financed benefit.

25. According to official statistics on poverty in Chile, calculated using the National Socio-Economic Survey, 15.1% of the population was living in poverty in 2009. This rate is only 10% for people aged 60 to 69 and 7.7% for people aged 70 and older. This indicator is calculated using survey data based on household per capita income. Positive poverty rates for old-age people since the introduction of the solidarity pillar is the result of an actual take-up rate of the solidarity benefits below 100%. The analysis here assumes a full take-up in the future.

26. In the intermediate scenario for France, the analysis assumes that people retire when they reach a target replacement rate (for those in employment just before retirement) or when they are entitled

to a full rate public pension (for the others). The target replacement rate is calculated by assuming that an individual retires as soon as his/her well-being as a retiree exceeds his/her well-being as a non-retiree. The target replacement rate is therefore equal to the inverse of his/her preference for inactivity, whatever the gain in pension level s/he would get by retiring later. For men, target replacement rates are randomly selected from a distribution with the median equal to 70%, while for women they are selected from a distribution with the median equal to 66%. For some people, this means they will retire before being entitled to a full rate public pension.

27. On the same direction, people moving in the later part of their career to jobs that pay lower wages may bring down their final earnings. One approach to adjust for lower hours and lower wages at the end of the career could be to use as final earnings the average of the last five years. However, this approach may still leave final earnings below career average in some cases.

28. Since the 2003 reform, the state pension system in France aims at providing a macro replacement rate (defined as the ratio between the median pension of people aged 65 to 74 to the median earnings of people aged 50 to 59) around two-thirds of final earnings by 2020 (see Conseil d'Orientation des Retraites, 2009). This reference of 66% of final earnings is also a historical social policy ambition of the Norwegian Confederation of Trade Unions.

29. The two biggest private pension funds in the Netherlands (APG and PGGM) aim at providing a wage-adjusted pension of 70% of career-average earnings. In the political debate however, the indexation method of career-average earnings is not always clearly specified.

30. People are often advised to plan to replace most of their pre-retirement income, and figures such as 80% or other comparable percentages are often used by retirement planners. Some refer to slightly lower levels such as 70%, while others recommend a benchmark replacement rate higher than 80% for the reason that retirees in the United States have to face long-term care and other health care needs. Eventually, the total target replacement percentage depends on the decisions made by individuals (and often by their employers).

31. These data compare well with estimates from the Department for Work and Pensions (DWP) who estimated the number of people amongst the current working-age population who will not meet the replacement rate targets originally suggested by the Pensions Commission, based on a dynamic micro-simulation model running on a sample of synthetic individuals. See DWP (2012).

32. The definition of low-income individuals used in this analysis (people with the 20% lowest final earnings) may also explain higher replacement rates for this income group. Households with relatively low final earnings compared to their earnings earlier in life have high replacement rates with regard to final earnings.

33. Figures 3.6 to 3.8 present the proportion of working-age individuals with a replacement rate below the OECD average rate of 54% for the United States and Chile, as there is no country-specific reference replacement rate for these countries.

34. The model predicts higher densities of contributions in the future.

35. These data are not shown but can be provided upon request. See also Hippe and Vøien (2014) for more detailed results for Norway.

36. Assuming an aggregate productivity growth of 2.7% in the optimistic scenario does not change the trends observed with an aggregate productivity growth of 2%.

37. Increasing coverage in private pension plans may imply some transition costs. These transition costs could stem from diverting contributions to PAYG-financed public pensions (e.g. Sweden), with its negative impact on public budgets. These costs could also stem from people diverting saving from other saving vehicles or from consumption (increasing overall savings in the economy). Generally, tax rates on pension savings are lower than for other saving vehicles affecting negatively public budgets. In addition, diverting consumption may reduce consumption tax intakes (e.g. VAT revenues) affecting as well negatively public budgets.

38. Chapter 4 in OECD (2012) introduces other policies to increase coverage in private pensions, such as developing financial education programmes, simplifying the steps and choices that must be taken for joining a plan, and allowing part of the assets accumulated to be withdrawn before retirement under exceptional circumstances.

39. The Dutch private pension system is actually considered as "quasi-mandatory" as participation in an occupational pension plan becomes mandatory if the sector's employers request the Ministry of Social Affairs and Employment to declare membership obligatory, and the employer organisations making the request represent at least 60% of employees in the sector.

40. See OECD (2014) for a discussion about the parameters that characterise automatic enrolment systems and how they could be defined in the Irish context.

41. In some cases, self-employed individuals who are ex-employees can voluntarily contribute to the pension fund of their previous employer and therefore continue to build up pension rights into the occupational pension system. Depending on the rules of the pension funds, this option may allow them to continue contributing for four years, 10 years or not at all.

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ANNEX 3.A1

Common methodology

This annex describes the main characteristics of the general framework applied in this analysis of the role of private pensions in retirement readiness across countries. While assumptions used to estimate pension rights have to be country-specific, there is a need for a common framework to assess the retirement readiness of people currently of working-age.

The analysis is based on the measure of what a representative sample of working-age individuals have already accumulated in terms of pension rights and pension assets, taken from survey or administrative data sets. It complements this stock of rights and assets with what people may accumulate from now until the day they retire using different scenarios regarding what may happen during this period. These scenarios are defined according to the values assumed for inflation, productivity growth, age of retirement, rate of return on assets and discount rate.

3.A1.1. Parameters of the model

The different values for those five parameters are combined into three coherent scenarios, representing pessimistic, optimistic and intermediate states of the world. These scenarios are common to all the countries covered. In order to build coherent macroeconomic scenarios, real returns on assets, discount rates and productivity growth are linked according to the following framework:

- The long-term interest rate on government bonds is assumed to be equal to the potential long-term growth of the economy in equilibrium;
- The potential long-term growth of the economy is assumed to be a function of productivity and labour force growth: (1 + *Productivity growth*) × (1 + *Labour force growth*);
- The discount rate is given by the long-term interest rate on government bonds;
- Returns on portfolio investment depend on the returns on equities and the portfolio composition. The return on equities is assumed to equal the return on long-term government bonds plus an equity premium. The analysis assumes a balanced portfolio comprising 60% in variable assets and 40% in fixed income.

Following this framework, participating countries' representatives and the OECD Secretariat agreed on the following values for productivity growth, labour force growth and equity premium for each of the three scenarios.

	Pessimistic	Intermediate	Optimistic
Productivity growth	0.7%	1.5%	2.7%
Labour force growth*	-0.3%	0.5%	1.0%
Equity premium (percentage points)	1.0	2.5	4.0
Real discount rate	0.4%	2.0%	3.7%
Real equity return	1.4%	4.5%	7.7%
Real rate of return assuming a 60/40 portfolio	1.0%	3.5%	6.1%

* -0.3% growth in the labour force is the Eurostat assumptions for EU countries for the period 2010-2060; 0.5% is just below the growth assumptions assumed for the US in the next 20 years by the US Bureau of Labour Statistics.

Taking into account all the parameters, the three scenarios are defined as follows:

Parameters	Pessimistic	Intermediate	Optimistic
Inflation	4%	2%	2%
Productivity growth	0.7%	1.5%	2.7%
Real rate of return	1%	3.5%	6.1%
Real discount rate	0.4%	2%	3.7%
Age of retirement	Early	Observed	Official or Observed + 2 years

3.A1.2. Sample selection

The analysis uses household and individual survey data as well as administrative data. It collects information about working-age individuals' socio-economic characteristics, careers, earnings level, as well as pension rights and pension assets already accumulated in the pension system. Panel data are used whenever possible to gather information about individuals' past.

The sample is selected as follows. When household level information is available, the sample includes the head of the household and the spouse. The other household members are excluded as usually no detailed information is available for them in most data sets. The sample only includes households where both spouses are older than 35, at least one of the spouses is younger than 65, and the head of the household does not declare him/herself as retired and not in the labour force.[1, 2] When only individual level information is available, the sample includes non-retired people aged between 35 and 64.

If there is a maximum age of retirement in the country analysed, individuals who have already reached that age are excluded from the sample.

The sample initially only includes individuals with a working history, i.e. who have worked at least once since the beginning of their career. Individuals who have never worked at the time of the data collection are therefore excluded. If the working history is only partially known, only individuals who were working at the time of the data collection or who have worked during the 5 preceding years are included in the sample.

To avoid excluding a significant part of working-age population, the sample also includes non-working spouses when household level information is available, as long as they are living with a partner with a working history.

There are cases when wages for the full working history may not be necessary to calculate benefits from PAYG, DB and DC pension plans. In most surveys, there is already data or information available that may render data on past wages unnecessary, for example:

- if the number of pension points accumulated at the time of the data collection is available for social security systems with points (e.g. France complementary pension plans);
- if assets accumulated in DC pension plans at the time of the data collection are available;
- if the number of years of membership in DB pension plans at the time of the data collection is available.

As long as one of these conditions is not met, there is a need to work on a sub-sample of individuals with wages for their full working history.[3]

3.A1.3. Age of retirement

The analysis considers that each individual in the household takes his/her own retirement decision. Three different assumptions are considered to determine the age of retirement.

- The individual retires as early as possible. This corresponds to the minimum age of retirement in each country. It usually comes with a reduced pension. It may depend on the number of years the individual has been contributing to the system.
- The individual retires at the actual average age of retirement observed in the country analysed. The analysis uses statistics on the effective age of labour market exit from OECD (2013) as a source for some countries.
- The individual retires at the official or statutory age of retirement of each country. That age may be the same for all individuals or may depend on the date of birth. It is usually the age when individuals are entitled to a full PAYG pension. It may depend on the number of years the individual has been contributing to the system.

In case the actual average age of retirement is larger than the official age of retirement, the analysis assumes that the individual retires at the actual average age of retirement plus two years rather than assuming s/he retires at the official age of retirement.

The individual may not be allowed yet to receive benefits from all his/her pension sources at the assumed age of retirement.[4] In those cases, the analysis assumes that s/he stops contributing and accruing pension rights from that date. However, the amount of pension benefits s/he may get at retirement is calculated at a later date, when s/he is allowed to receive all his/her pension benefits.

If at the time of the data collection the individual is already older than the age of retirement assumed in the hypothesis chosen, the analysis assumes that s/he retires as of the following year.

If both spouses do not retire the same year, the benefits of the one retiring the first are adjusted to the year when the second spouse retires, in line with the rules in each pension system.

3.A1.4. Employment status and earnings going forward

Inflation is assumed to be fixed during the whole projection period. It takes the values of 4% or 2% depending on the scenario.

When data are available, the analysis uses transition probabilities between the different employment statuses and wage equations estimated from survey or administrative data to project the employment status and real earnings going forward until retirement.

As an alternative, the analysis extrapolates future earnings based on past earnings which are adjusted for inflation and productivity growth. Productivity growth is divided between aggregate productivity growth and age-related productivity growth. Aggregate productivity growth is assumed to be fixed during the whole projection period and identical across individuals, taking the values of 0.7%, 1.5% and 2.7% depending on the scenario. The age-specific productivity growth factors are calculated using cross-section data on earnings by socio-economic characteristics for as many years as possible. The analysis calculates the change in average earnings (in per cent) between different age groups in each year and then averages them out. The resulting changes are distributed linearly across the different single ages to get the age-specific productivity growth factors.[5]

Future earnings also depend on the employment status in each year:

- Wages in year N are equal to wages in year N-1 adjusted for inflation and productivity growth for individuals employed in year N. If the wage in year N-1 is null or missing, the wage in year N is set equal to the last positive wage.
- Individuals unemployed or out of the labour force in a given year are assumed to have a wage equal to zero that year. If they go back to employment, the analysis assumes they earn the same wage as their last positive wage, adjusted for the corresponding age-specific productivity growth factor.[6] Wages earned thereafter are adjusted for inflation and productivity growth, until retirement.

The employment status going forward is based on the most reasonable scenario for each country. Individuals are randomly assigned an employment status in each year of the simulation based on the long-term unemployment rate in the country analysed and on the probability to ever suffer a spell of unemployment during one's career. If the unemployment rate observed at the time of the data collection is higher (lower) than the long-term unemployment rate, the analysis randomly selects individuals unemployed (employed) at the time of the survey and assume they go back to employment (lose their job) during the following five years so that the unemployment rate converges towards its long-term value. The analysis also assumes random spells of unemployment for individuals employed at the time of the data collection but who have never suffered spells of unemployment yet, so that the proportion of individuals experiencing unemployment equals 40% in each age group.[7] They are assumed to suffer only one spell of unemployment.

3.A1.5. Projection of PAYG/public pension benefits

This part depends on each country's pension system and is described in the relevant country sections in Antolin and Payet (2014).

PAYG pension benefits are adjusted upward (downward) for late (early) retirement according to the rules in the country analysed.

If both spouses do not retire the same year, the PAYG pension benefits of the one who retires first are adjusted for inflation (or any other index depending on the rule in the country analysed) to get an equivalent value up to the year the second spouse retires.

3.A1.6. Projection of benefits from funded pension plans based on accumulated rights (DB)

The analysis assumes that individuals covered by a DB pension plan at the time of the data collection will continue to be in the same plan until they retire.

The analysis therefore calculates the total number of years in the plan as the number of years in the plan at the time of the data collection plus the remaining number of years until retirement. When the number of years in the plan is missing or not available, the current tenure in the job offering the plan is used instead. When both the number of years in the plan and the tenure in the job offering the plan are not available, the analysis assumes the individual has been covered in each year s/he has been employed. Years during which the individual is unemployed are not counted as years in the plan.[8]

The analysis calculates expected benefits from DB pension plans using the actual formula of the plan the individual is a member of, when available. Otherwise expected benefits are calculated as the product between the total number of years in the plan, the accrual rate and the reference wage. When the accrual rate is not available, the analysis assumes 1.5%.[9] The reference wage taken into account in the benefit formula can be for instance the final wage, the average wage during the career, or the average wage during the last few years. When this information is not available, the analysis assumes a final wage DB formula.

When the individual has a DB plan with a former employer and already receives benefits from it, the analysis uses the amount of benefits declared by the individual. The benefits are adjusted for inflation to get an equivalent value the year the individual effectively retires if the individual declares that the benefits are effectively adjusted for the cost of living.

When the individual has a DB plan with a former employer and expects to receive benefits in the future from it, the analysis uses the amount of expected benefits declared by the individual. When the individuals do not know what their expected benefits will be, the analysis calculates them using exactly the same formula as for the current DB plan (if the number of years in the former DB plan is available or can be estimated).

3.A1.7. Projection of benefits from funded pension plans based on assets accumulated (DC/hybrid)

The analysis covers here all plans in which benefits are based on the level of assets accumulated in the plan at the time of retirement. This is obviously the case of pure DC pension plans, but also of hybrid DB plans, in which benefits depend on a rate of return credited to contributions (e.g. cash balance plans in the United States).

The analysis herein assumes that an individual covered by a DC or hybrid pension plan at the time of the data collection will continue to be in the same plan until s/he retires.

In order to estimate benefits from DC and hybrid pension plans, information on contribution rates and on the level of assets accumulated at the time of the data collection is needed.

The analysis considers both employee and employer contribution rates. If employer (employee) contributions are mandatory, missing and null values in the data set are replaced by the average employer (employee) contribution rate observed for individuals with positive employer (employee) contribution rate.

When the contribution rate is not available, the level of contributions is required, and is transformed into a contribution rate by dividing contribution levels at the time of the

data collection by the gross amount earned in the main job at the time of the data collection. When the amount earned in the main job is missing, the analysis uses total wages and salaries earned (possibly from several employments).

When the level of assets at the time of the data collection is available, the further accumulation up to retirement assumes a constant contribution rate (equal to the one observed at the time of the data collection – employee plus employer) and a constant real rate of return on assets (depending on the scenarios, real rate of return can take the values of 1%, 3.5% or 6.1%).

When the level of assets at the time of the data collection is not available, the analysis needs to build the whole accumulation, from the time the individual joined the plan until retirement, assuming the same contribution rate (equal to the one observed at the time of the data collection) and real rate of return during the whole period. When the total number of years in the plan is missing, the analysis uses the current tenure in the job.

If the individual suffers unemployment, the analysis assumes s/he keeps the assets accumulated in the plan and transfers all the assets when going back to employment into a new plan with the same characteristics. This is equivalent to assuming that the individual stays in the plan but does not contribute during the years of unemployment. The assets therefore continue to accumulate even during unemployment periods with the return credited to past contributions.

The analysis transforms estimated assets accumulated at retirement into a stream of pension income by calculating the benefit payment of a non-inflation indexed fixed annuity priced using the annuity premium formula, based on current life expectancy tables by age and gender for each country and a constant discount rate (taking values of 0.4%, 2% or 3.7% depending on the scenario):

$\frac{1}{nominal\ discount\ rate} \times \left(1 - \frac{1}{(1 + nominal\ discount\ rate)^{lexERA}}\right)$, where lexERA is the life expectancy at the effective age of retirement.

Benefits already in receipt or expected in the future from former plans are also taken into account.

3.A1.8. Evolution of private pension coverage for voluntary systems

The coverage of voluntary private pension plans going forward is based on the most reasonable scenario for each country.

In countries where coverage increases with age, the model randomly selects individuals not covered by any private pension plan at the time of the data collection to become members of a plan during the simulation, following the age-specific coverage rates currently observed in the data.[10]

In countries where new private pension products have been introduced recently and are expected to cover a larger share of the population in the future, the model randomly selects individuals not covered by any private pension plan at the time of the data collection to become members of a plan during the simulation, with the coverage rate converging asymptotically towards a reasonable target based on the current trend.

Considering the shift from DB to DC schemes, all new pension plan members are assumed to join a DC plan.

The contribution rate that new pension plan members will have corresponds to the average contribution rate observed for individuals currently having a DC pension plan, broken down by age and income level.

Assets in the new DC plan are accumulated from the year the individual gains membership until retirement and are transformed into a stream of pension income using the same annuity formula as for current hybrid and DC pension plans.

3.A1.9. Projection of non-contributory pension benefits

Once all pension sources have been projected at retirement for each member of the household, the corresponding incomes are summed across households' partners. Total household pension income is then divided by 1.5 in the case of couples (using the OECD-modified equivalence scale which assigns a weight of 1 for the first adult and of 0.5 for the second) and the result is assigned to the head and his/her spouse.[11]

Non-contributory pension benefits (e.g. safety net or solidarity pension programmes) may also be added to the total household income, before dividing by the equivalence factor of 1.5. When the total pension income of the household falls under a certain threshold, which is usually inflation indexed, the analysis calculates the amount of non-contributory pension benefits that the household is entitled to.

3.A1.10. Housing wealth

The analysis also accounts for the role that housing can play to complement pension income at retirement when data are available. It considers the option of converting housing equity into a stream of income. The analysis assumes that the net housing wealth is used as collateral to get annuity payments at retirement until passing away.[12] This differs from instruments currently available in the market to convert housing equity into a stream of income. For example, in the United States, reverse annuity mortgages allow loan proceeds to be taken as fixed monthly payments until the individual leaves the house. With such instruments, the individual can pay back the loan to the lender and keep the house. However, the amount of the loan is generally based on a small percentage of the value of the house (e.g. 20% to 50%). In the approach used here, the individual gets life annuity payments based on the full net value of the house and the provider keeps the house after the annuitant passes way.

Individuals not owning their home at the time of the data collection are assumed to remain in that situation until retirement. This is like assuming that most homeowners bought their first home by age 35-40.

For homeowners, net housing wealth at retirement is calculated as the value of the property at retirement minus the mortgage value left at retirement. The analysis assumes that property prices do not grow in real terms. This means that the value of the property, as declared by individuals at the time of the data collection, remains constant in real terms until the day they retire. Based on the mortgage value at the time of the data collection, the mortgage value in each year until retirement is calculated as: $Mortgage(t) = Mortgage(t-1) \times (1+r) - Payment$, where r is the interest rate (5% in nominal terms when the actual rate is not available in the data) and Payment is the mortgage payment (1/3rd of salary when the actual payment is not available in the data). When the mortgage value at the time of the data collection is not provided in the data, the analysis assumes that net housing wealth at retirement is equal to 80% of the value of the property at retirement.

3.A1.11. Indicators of retirement readiness

The sample includes people at different ages, between 35 and 64, who will retire at different points in time. Consequently, in the case of some indicators, in order to determine the percentage of people with potential pension income above or below certain thresholds (the poverty line or the average pension income of current retirees for example), the analysis needs to bring their potential pension income to the same point of time, calculating its present value. To calculate the present value, the analysis focuses on purchasing power (discounting by inflation) and on income distribution (discounting by wage growth, i.e. productivity growth and inflation). Box 3.A1.1 discusses this matter in more detail.

All the indicators described below are calculated before tax. However, the personal tax system often plays a role in old-age support. Indeed, pensioners often do not pay social security contributions. Personal income taxes are progressive and pension entitlements are usually lower than earnings before retirement, so the average tax rate on pension income is typically less than the tax rate on earned income. In addition, most income tax systems give preferential tax treatment either to pension income or to pensioners, by giving additional allowances or credits to older people. The analysis herein does not consider these effects. For more information on the tax treatment of pensions and pensioners, see OECD (2013).

As far as possible, the indicators are broken down by age (5-years age brackets), gender, income (3 groups: 20% lowest pre-retirement income; 20% highest pre-retirement income; 60% remaining middle pre-retirement income), sector (public vs. private) and employment status (employee vs. self-employed).

Coverage

The analysis calculates the proportion of individuals receiving pension benefits from each of the different income sources at retirement.

Income composition

The analysis calculates the average share of each income source in total pension income.

Proportion of working-age individuals with a present value of pension income below a current measure of poverty

The analysis calculates this indicator using two different measures of poverty:

- the country-specific measure of poverty; and
- the OECD measure of poverty: 50% of the total population equivalised median income.[13]

Depending on whether the poverty threshold is an absolute or a relative measure, the potential pension income at retirement of working-age individuals is discounted by inflation only or by inflation and productivity growth respectively, to bring that income at the same point of time for all individuals (see Box 3.A1.1).

Proportion of working-age individuals that may retire with a pension income below current retirees' average pension income

The analysis uses household and individual survey data as well as administrative data to collect information on current retirees. It defines recently retired people as those who

have spent up to five years in retirement. Only income sources earmarked for retirement (i.e. PAYG public pensions and funded private pensions, whether occupational or personal) are considered when calculating the average pension income of recent retirees. The potential pension income of future retirees is discounted by inflation to express it in the same year as current retirees' pension income and in purchasing power equivalent (see Box 3.A1.1).

Proportion of working-age individuals that may fail to reach a reference replacement rate

The replacement rate is defined here as the ratio between potential pension income at retirement and pre-retirement earnings. As there is no consensus on the proper denominator to represent pre-retirement earnings, the analysis uses different approaches to calculate those earnings.

The most common approach is to use final earnings. They are used when assuming that people are interested in replacing the earnings they enjoy immediately prior to retirement. Final earnings replacement rates are however very sensitive to the last earnings value which can be particularly volatile. For example, people may reduce working hours just before retirement, compromising the usefulness of replacement rates based on final earnings. Moreover, final earnings do not represent the career wage profile of individuals in which pension contributions have been based.

Therefore, as an alternative to final earnings, career-average earnings can be used to calculate replacement rates. One approach is to use inflation-indexed career-average earnings. This method has the effect of comparing pension income to the average purchasing power of earnings throughout a worker's career, without regards to changes in the general standard of living over that time. It is in line with the consumption smoothing assumption of the life-cycle model when assuming that people are interested in replacing lifetime income in purchasing power terms.[14] The final approach used is to compute wage-indexed career-average earnings. This method provides a measure of the average standard of living throughout the worker's career. The use of average wage indexing equates earnings levels over the career relative to the standard of living of workers at the time of retirement. As the standard of living rises over time, using wage-indexed career-average earnings brings the average up to date to the standard of living at the end of career.[15] Replacement rates are therefore calculated in three different ways, as follows:[16]

- RR1: Ratio of potential pension income at retirement to final earnings
- RR2: Ratio of potential pension income at retirement to inflation-indexed career-average earnings (excluding years with no earnings)
- RR3: Ratio of potential pension income at retirement to wage-indexed career-average earnings (excluding years with no earnings)

The replacement rates calculated in this analysis are complementary to the ones published in the OECD *Pensions at a Glance* series. *Pensions at a Glance* calculates theoretical replacement rates for an individual entering the labour market today at age 20 and working for a full career in the private sector at the average wage until the official age of retirement (which varies between countries). The rules of the pension system that applies to that individual are the rules in the current legislation for all mandatory pension schemes (voluntary funded occupational pension plans are also included for some countries where they have a broad coverage). One could argue that the replacement rates in *Pensions at a Glance* are a sort of maximum replacement rates an individual can achieve in each country given current rules, because of the full career assumption.

The replacement rates in this analysis are generally lower than those in *Pensions at a Glance* because it uses actual data for individuals 35 and older, and therefore it is very unlikely that everybody will work for a full career. In contrast to *Pensions at a Glance*, this analysis combines actual information on individuals from different cohorts (aged 35 to 64) with projections about their labour history until retirement. It uses historical information on their career from representative survey or administrative data sets to assess what they have already accumulated in terms of pension rights and assets under the pension system's rules that applied during those years. This stock of rights and assets is then complemented given current pension legislation, using scenarios projecting each individual's labour history until retirement under different economic conditions (e.g. inflation, productivity growth, rates of return, etc.) and individual behaviour (age of retirement). The calculations cover all sources of pension income, whether they are mandatory or voluntary, occupational or personal, PAYG-financed or funded. Finally, looking at a sample of actual individuals allows breaking down replacement rates by different socio-economic characteristics.

The analysis then calculates the proportion of individuals with a replacement rate (RR1) below 54% (corresponding to the OECD average replacement rate in *Pensions at a Glance 2013*) and the proportion of individuals with a replacement rate below a country-specific reference (either RR1, RR2 or RR3 depending on the definition of the reference). The country-specific reference should represent the explicit or implicit benchmark of the pension system in terms of benefits, usually defined for an individual with average earnings working for a full career.

Housing wealth

The analysis calculates two indicators when taking into account the stream of income that people can extract from housing wealth in the sources available to finance retirement: the proportion of people with a replacement rate (RR1) below 54% and the share of annuity payments from housing in total income at retirement. It does so by adding to the previously calculated potential pension income the annuity payments obtained from converting housing equity into a stream of income.

Box 3.A1.1. **Productivity discounting, purchasing power and income distribution**

The goal of calculating present values is to compare monetary values at the same point of time. The most common one is to express income or wages in terms of their purchasing power in one reference year (e.g. in 2010 euros). This leads to expressing income or wages in real terms. For this purpose the discount rate is the inflation rate.

However, real income in two different points of time may differ because of productivity growth. The wage of two individuals with the same labour history and the same occupation may be higher in 2020 than in 2010 in real terms because productivity has increased. Therefore, in real terms (after discounting by inflation) the same person would have a higher wage and higher purchasing power in 2020 than in 2010 at the same age.

There are in practice two different productivity factors that make individuals' wages to differ across time and across ages. Individuals' wages increase as they age because there is an age-productivity factor. However, wages also increase as a result of increases in the general productivity (aggregate productivity) in a country. The growth of wages as one becomes older (age-specific productivity) is different from the growth of wages resulting from aggregate productivity.

Box 3.A1.1. **Productivity discounting, purchasing power and income distribution** *(cont.)*

The aggregate productivity factor lifts all boats and means that two individuals with the same labour history (e.g. employment record and occupation) will have different real wages at the same age in different points of time. The individual aged 60 in 2010 will have lower real wages than the same individual aged 60 in 2020, simply because the latter lives in a wealthier society.

The age-specific productivity factor means that two individuals in the same year, same occupation and labour history, but one aged 40 and another one 50 will have different wages, with the latter having generally higher wages.

Following the arguments stated above, it is adequate to discount using only inflation when the issue to analyse is the purchasing power of two wages in different periods of time. In this context, one expresses wages in e.g. 2010 euros. However, if one is concerned about income distribution, things are different and discounting only by inflation and expressing things in just real terms may not be fully adequate.

If the policy goal is to assess how two individuals compare in terms of their relative situation in the income scale of their country, there is a need to discount by inflation and the overall aggregate productivity growth. However, age-specific productivity growth should not be used for discounting.

All of the above affects the way the indicators are calculated in this analysis. More specifically, the discounting method varies depending on whether the income of future retirees (that are retiring in different years) is compared with absolute or relative poverty thresholds, whether individuals are classified according to different income levels (low, medium and high-income groups), or whether future retirees are compared to current retirees. The discounting method is irrelevant when calculating replacement rates of people retiring in different years.

Regarding the **classification of individuals according to different income level groups** (based on the final wage), the final wage needs to be discounted by aggregate productivity growth. Otherwise, it is very likely that two individuals with the same labour history and occupation but different ages (and therefore retiring in different years) will be classified in different groups when they should be assigned to the same income group. Relatively to the society they each live in, both individuals should be in the same position (and same income level group) because they both enjoyed the same growth in earnings during their career. This means that the *final wage needs to be discounted by aggregate productivity growth as well as inflation*. Failing to discount by aggregate productivity growth would lead to an over-representation of young individuals in the group of high income and an over-representation of old individuals in the group of low income.

Regarding **absolute poverty thresholds**, they are generally revised with inflation on an annual basis in most countries. The idea seems to be to make sure that people can maintain a minimum purchasing power over time in the society they live in. Therefore, when comparing different individuals retiring at different points in time to see whether their retirement income puts them above that minimum purchasing power threshold, *retirement income only needs to be discounted by inflation*. Obviously, individuals retiring later will be more likely to be above the absolute poverty threshold because they have enjoyed aggregate productivity growth and they live in a wealthier society.

Things are different when looking at **relative poverty**. Relatively to the society, both individuals should be in the same position because they both enjoyed the same growth in earnings during their career. This means that the *retirement income* of two individuals retiring at different points in time needs to be *discounted by inflation and aggregate productivity growth*. The same applies when an absolute poverty threshold is revised with wage growth annually.

Finally, the **comparison with current retirees** is *similar to the comparison with an absolute poverty line*. Once in payment, pension benefits generally only increase with inflation. Because the individual retiring at the same age but later in time is living in a wealthier society, s/he can end up with a pension above the one of current retirees. Therefore, everything else equal, future retirees would be better-off than current retirees. This analysis assesses whether this is the case. When it is not, it may be due to other factors such as pension reforms reducing benefit entitlements, or lower returns to portfolio investment.

Notes

1. The analysis shuns from the younger workers (i.e. those aged 16 to 24 and 25 to 34) as their past labour histories may be short or non-existent and thus strong assumptions about their future work histories would be required.
2. When the head of the household is not defined in the data set, the analysis assumes that the head is the prime wage earner.
3. If the full working and earnings history is not available however, it is not possible to calculate the replacement rate with respect to career-average earnings.
4. For instance, in the Netherlands, people cannot receive their public pension benefits before the official age of retirement, but may retire earlier from their occupational pension plan.
5. The aggregate productivity growth parameter is adjusted downwards (upwards) if the age-specific productivity growth factors produce a positive (negative) result when applied to the sample.
6. The last positive wage is also adjusted for aggregate productivity growth if the aggregate productivity growth is negative in year N.
7. According to the labour market literature, on average, only around 40% of individuals in any given cohort suffer spells of unemployment. See Taylor and Booth (1996), Dex and McCulloch (1998) and Schmillen and Möller (2010).
8. The analysis assumes that an individual covered by a DB plan and suffering unemployment goes back to employment with the same employer or within the same industry, then keeping rights in his/her DB plan.
9. This rate is based on the most common practice of DB plans in many countries.
10. For instance, let assume that, at the time of the data collection, occupational private pension plans cover 47% of the employed population for individuals aged between 35 and 39 and 52% of the employed population for individuals aged between 40 and 44. When individuals aged 35 to 39 reach 40 to 44 in the simulation, their coverage rate is set equal to 52% by adding new members.
11. Other equivalence scales could be used. For example, the square root equivalence scale is used in other OECD publications comparing income inequality and poverty across countries.
12. The annuity calculation follows the same methodology as presented in section 3.A1.7 for DC assets.
13. The analysis uses the OECD-modified equivalence scale. This scale assigns a weight of 1 for the first adult and 0.5 for the second. Other scales may be used, for example the square root equivalence scale.
14. Boskin and Shoven (1987), Rettenmaier and Saving (2006) and Biggs and Spingstead (2008) advocate the inflation-indexed average of lifetime earnings for the calculation of income replacement rates. They argue that inflation-indexed average earnings better capture the real level of resources available for consumption over a worker's lifetime than wage-indexed average earnings, as the latter overstate real earnings in past years.
15. See Goss et al. (2014) for an analysis of different approaches to developing replacement rates for new retirees in the US context.
16. In the case of couples, the denominator corresponds to the equivalised pre-retirement earnings.

ANNEX 3.A2

Summary tables for the three scenarios

This annex provides summary tables for each of the three scenarios modelled in this analysis. It includes one section for each country covered by the chapter. Each section contains one table with the values taken by the parameters for each scenario and three tables summarising the main results for the pessimistic scenario, the intermediate scenario and the optimistic scenario respectively. The summary tables include three indicators:

- the average composition of potential pension income at retirement,
- the proportion of working-age individuals that may retire with a pension income below current retirees' average pension income, and
- the proportion of working-age individuals that may fail to reach their country-specific reference replacement rate (or the OECD average of 54% when the country does not have such implicit or explicit reference).

3.A2.1. Chile

In Chile, all pension benefits are inflation-indexed. There is no need therefore to introduce an inflation effect in the model for that country.

Table 3.A2.1. **Chile: Values of parameters for each scenario**

	Pessimistic	Intermediate	Optimistic
Productivity growth	0.7%	1.5%	2.7%
Real rate of return	1%	3.5%	6.1%
Real discount rate	0.4%	2.0%	3.7%
Age of retirement	Men: 59 Women: 57	Men: 63 Women: 60	Men: 65 Women: 60

StatLink http://dx.doi.org/10.1787/888933156968

Table 3.A2.2. **Chile: Summary table for the pessimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 54%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	64	0	36	63	57
Low income	78	0	22	96	16
Medium income	69	0	31	68	66
High income	39	0	61	16	66
35-39	63	0	37	58	67
40-44	65	0	35	65	57
45-49	68	0	32	69	53
50-54	65	0	35	63	50
55-59	61	0	39	56	53
60-64	55	0	45	48	51
Men	60	0	40	49	63
Women	70	0	30	79	49
Public sector	50	0	50	35	64
Private sector	64	0	36	61	58
Employees	59	0	41	52	53
Self-employed	75	0	25	81	73

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. The classification between public and private sector workers and between employees and self-employed people is done based on information collected between 2002 and 2009. The mode is used for individuals who changed sectors or employment status during that period. Individuals not in employment between 2002 and 2009 are not included in these breakdowns.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156974

Table 3.A2.3. **Chile: Summary table for the intermediate scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 54%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	54	0	46	42	49
Low income	73	0	27	82	21
Medium income	59	0	41	41	55
High income	24	0	76	6	57
35-39	50	0	50	25	53
40-44	54	0	46	40	47
45-49	59	0	41	52	51
50-54	58	0	42	53	44
55-59	52	0	48	45	49
60-64	47	0	53	37	45
Men	47	0	53	26	48
Women	63	0	37	61	51
Public sector	37	0	63	19	54
Private sector	54	0	46	39	48
Employees	48	0	52	30	42
Self-employed	66	0	34	59	69

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. The classification between public and private sector workers and between employees and self-employed people is done based on information collected between 2002 and 2009. The mode is used for individuals who changed sectors or employment status during that period. Individuals not in employment between 2002 and 2009 are not included in these breakdowns.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156982

Table 3.A2.4. **Chile: Summary table for the optimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 54%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	44	0	56	28	47
Low income	67	0	33	60	29
Medium income	48	0	52	27	53
High income	13	0	87	3	44
35-39	36	0	64	9	48
40-44	43	0	57	22	45
45-49	50	0	50	39	54
50-54	51	0	49	43	45
55-59	45	0	55	38	44
60-64	39	0	61	32	38
Men	34	0	66	15	38
Women	56	0	44	42	58
Public sector	26	0	74	10	44
Private sector	43	0	57	25	45
Employees	36	0	64	18	37
Self-employed	58	0	42	40	69

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. The classification between public and private sector workers and between employees and self-employed people is done based on information collected between 2002 and 2009. The mode is used for individuals who changed sectors or employment status during that period. Individuals not in employment between 2002 and 2009 are not included in these breakdowns.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933156995

3.A2.2. France

Table 3.A2.5. **France: Values of parameters for each scenario**

	Pessimistic	Intermediate	Optimistic
Inflation	4%	2%	2%
Productivity growth	1.0%	1.5%	2.0%
Real rate of return	1%	3.5%	6.1%
Real discount rate	0.4%	2.0%	3.7%
Age of retirement	62	Target RR	Full rate

Notes: RR = replacement rate. In the optimistic scenario, the analysis assumes a productivity growth of 2% instead of 2.7% to be in line with the assumptions used by the COR (Conseil d'Orientation des Retraites). Both rates of productivity growth lead to same conclusions. In the intermediate scenario, the analysis assumes that people retire when they reach a target replacement rate (for those in employment just before retirement) or when they are entitled to a full rate public pension (for the others). The target replacement rate is calculated by assuming that an individual retires as soon as his/her well-being as a retiree exceeds his/her well-being as a non-retiree. The target replacement rate is therefore equal to the inverse of his/her preference for inactivity, whatever the gain in pension level s/he would get by retiring later. For men, target replacement rates are randomly selected from a distribution with the median equal to 70%, while for women they are selected from a distribution with the median equal to 66%. For some people, this means they will retire before being entitled to a full rate public pension. The full rate, fixed at 50%, can be obtained automatically at age 67 for those born from the 1st of January 1955. It can also be obtained from age 62 if the individual has the full rate duration of insurance (it is currently 41.5 years, or 166 quarters, for people born in 1955 for example).

StatLink http://dx.doi.org/10.1787/888933157003

Table 3.A2.6. **France: Summary table for the pessimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 66%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	96	0	4	40	66
Low income	97	0	3	91	24
Medium income	96	0	4	40	67
High income	95	0	5	4	94
35-39	95	0	5	33	70
40-44	95	0	5	35	68
45-49	96	0	4	40	65
50-54	97	0	3	42	64
55-59	98	0	2	47	64
60-64	99	0	1	50	65
Men	95	0	5	22	74
Women	97	0	3	57	59
Public sector	97	0	3	35	64
Private sector	96	0	4	41	66
Employees	96	0	4	39	67
Self-employed	91	0	9	57	49

Note: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157015

Table 3.A2.7. **France: Summary table for the intermediate scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 66%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	95	0	5	35	61
Low income	96	0	4	88	45
Medium income	95	0	5	28	69
High income	95	0	5	2	84
35-39	93	0	7	28	67
40-44	94	0	6	30	65
45-49	95	0	5	35	59
50-54	96	0	4	39	57
55-59	98	0	2	41	59
60-64	98	0	2	40	59
Men	94	0	6	18	65
Women	97	0	3	51	58
Public sector	97	0	3	26	59
Private sector	95	0	5	37	62
Employees	96	0	4	34	62
Self-employed	87	0	13	48	40

Note: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157029

Table 3.A2.8. **France: Summary table for the optimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 66%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	92	0	8	27	37
Low income	95	0	5	75	25
Medium income	92	0	8	20	34
High income	91	0	9	2	58
35-39	88	0	12	21	45
40-44	89	0	11	23	40
45-49	91	0	9	27	35
50-54	93	0	7	29	32
55-59	95	0	4	32	37
60-64	98	0	2	33	31
Men	90	0	10	14	40
Women	94	0	6	39	34
Public sector	95	0	5	19	33
Private sector	92	0	8	29	38
Employees	93	0	7	26	37
Self-employed	82	0	18	37	25

Note: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157037

3.A2.3. The Netherlands

Table 3.A2.9. **The Netherlands: Values of parameters for each scenario**

	Pessimistic	Intermediate	Optimistic
Inflation	4%	2%	2%
Productivity growth	0.7%	1.5%	2.7%
Real rate of return	1%	3.5%	6.1%
Real discount rate	0.4%	2.0%	3.7%
Age of retirement	62	65	67
Indexation of occupational pensions	0%	50%	100%

StatLink http://dx.doi.org/10.1787/888933157042

Table 3.A2.10. **The Netherlands: Summary table for the pessimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with career-average earnings RR < 70%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	70	27	2	77	79
Low income	85	13	2	92	29
Medium income	71	27	2	86	88
High income	54	43	3	35	98
35-39	74	24	2	88	87
40-44	73	25	2	85	87
45-49	72	26	2	81	83
50-54	70	28	2	74	80
55-59	67	31	2	65	69
60-64	64	34	2	57	54
Men (single)	77	22	2	81	73
Women (single)	83	16	1	90	43
Public sector	60	38	2	56	92
Private sector	70	28	2	79	84

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. Self-employed and individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers.

Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157053

Table 3.A2.11. **The Netherlands: Summary table for the intermediate scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with career-average earnings RR < 70%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	57	39	4	35	58
Low income	77	20	3	77	18
Medium income	57	40	3	31	62
High income	38	57	5	4	86
35-39	58	39	3	31	69
40-44	58	39	4	33	68
45-49	58	38	4	35	61
50-54	57	39	4	36	54
55-59	56	41	4	38	44
60-64	56	41	3	41	38
Men (single)	65	32	3	45	44
Women (single)	73	25	2	63	18
Public sector	56	52	3	9	60
Private sector	45	41	3	32	63

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. Self-employed and individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157062

Table 3.A2.12. **The Netherlands: Summary table for the optimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with career-average earnings RR < 70%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	50	44	6	20	25
Low income	72	23	5	62	9
Medium income	49	45	6	12	24
High income	31	61	8	1	41
35-39	50	44	6	15	19
40-44	50	44	6	17	24
45-49	50	43	6	19	25
50-54	50	44	6	20	26
55-59	50	44	6	24	28
60-64	52	43	5	32	30
Men (single)	58	37	5	29	19
Women (single)	68	29	3	46	8
Public sector	38	57	5	3	14
Private sector	49	46	6	15	25

Notes: PAYG=pay-as-you-go; FP= funded pensions; RR=replacement rate. Self-employed and individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157078

3.A2.4. Norway

Productivity is not modelled for Norway as all monetary values are expressed in terms of "G", the general wage increase in the Norwegian economy. There is therefore no variation for this parameter across scenarios.

Table 3.A2.13. **Norway: Values of parameters for each scenario**

	Pessimistic	Intermediate	Optimistic
Inflation	4%	1.75%	2%
Real rate of return	1%	2.6%	6.1%
Real discount rate	0.4%	0.7%	3.7%
Age of retirement	As early as possible (62)	67	70

StatLink http://dx.doi.org/10.1787/888933157088

Table 3.A2.14. **Norway: Summary table for the pessimistic scenario**

In per cent

	Potential pension income composition				Proportion of individuals with final earnings RR < 66%
	PAYG/public pension	FP based on rights	FP based on assets	AFP pension	
All individuals	44	47	3	5	87
Low income	41	53	2	4	38
Medium income	43	49	3	5	97
High income	50	38	6	6	100
35-39	45	45	5	5	86
40-44	45	46	5	5	86
45-49	46	46	4	5	86
50-54	44	48	2	6	87
55-59	42	50	1	6	87
60	41	52	1	6	88
Men	56	33	4	7	91
Women	31	64	2	3	82
Public sector	0	100	0	0	80
Private sector	75	10	6	9	91

Notes: PAYG = pay-as-you-go; FP = funded pensions; AFP = Norwegian collectively negotiated labour market pension system; RR = replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157098

Table 3.A2.15. **Norway: Summary table for the intermediate scenario**

In per cent

	Potential pension income composition				Proportion of individuals with final earnings RR < 66%
	PAYG/public pension	FP based on rights	FP based on assets	AFP pension	
All individuals	71	21	3	5	64
Low income	81	14	1	4	17
Medium income	73	20	2	5	68
High income	63	28	4	6	93
35-39	71	21	4	5	70
40-44	71	21	3	5	68
45-49	72	21	3	5	65
50-54	72	21	2	5	62
55-59	70	23	1	6	54
60	71	23	1	6	53
Men	72	18	3	7	71
Women	70	25	2	3	56
Public sector	64	36	0	0	49
Private sector	77	10	4	9	74

Notes: PAYG = pay-as-you-go; FP = funded pensions; AFP = Norwegian collectively negotiated labour market pension system; RR = replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157104

Table 3.A2.16. **Norway: Summary table for the optimistic scenario**

In per cent

	Potential pension income composition				Proportion of individuals with final earnings RR < 66%
	PAYG/public pension	FP based on rights	FP based on assets	AFP pension	
All individuals	71	18	6	5	40
Low income	81	11	4	4	2
Medium income	73	17	5	5	38
High income	61	25	9	6	78
35-39	68	17	10	5	46
40-44	69	18	8	5	43
45-49	70	19	6	5	40
50-54	72	19	4	6	37
55-59	73	18	3	6	32
60	75	17	2	6	33
Men	70	16	7	7	47
Women	71	21	4	4	32
Public sector	68	32	0	0	27
Private sector	73	9	10	9	48

Notes: PAYG = pay-as-you-go; FP = funded pensions; AFP = Norwegian collectively negotiated labour market pension system; RR = replacement rate.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157111

3.A2.5. The United Kingdom

Table 3.A2.17. **The United Kingdom: Values of parameters for each scenario**

	Pessimistic	Intermediate	Optimistic
Inflation	4%	2%	2%
Productivity growth	0.7%	1.5%	2.7%
Real rate of return	1%	3.5%	6.1%
Real discount rate	0.4%	2.0%	3.7%
Age of retirement	60	Women: 62 Men: 65	SPA

Note: SPA = State Pension age.

StatLink http://dx.doi.org/10.1787/888933157121

Table 3.A2.18. **The United Kingdom: Summary table for the pessimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < PC's target
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	70	19	11	70	40
Low income	88	5	7	98	4
Medium income	70	20	10	75	44
High income	49	34	17	26	65
35-39	66	20	13	58	45
40-44	68	22	11	64	41
45-49	67	22	11	67	40
50-54	70	20	10	75	39
55-59	72	17	11	81	40
60-64	78	12	9	80	36
Men (single)	70	16	14	79	55
Women (single)	79	16	5	88	33
Public sector	60	32	8	57	35
Private sector	73	14	12	73	42
Employees	69	21	10	68	39
Self-employed	76	10	14	84	51

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate; PC = Pensions Commission. Individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers.

Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157139

Table 3.A2.19. **The United Kingdom: Summary table for the intermediate scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < PC's target
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	64	21	15	42	36
Low income	86	5	9	90	7
Medium income	64	22	14	36	41
High income	40	37	23	8	47
35-39	58	22	20	23	38
40-44	60	24	16	31	35
45-49	60	24	16	34	34
50-54	64	23	13	46	37
55-59	68	19	13	58	37
60-64	76	13	11	72	34
Men (single)	62	18	20	52	48
Women (single)	76	17	7	73	30
Public sector	54	36	11	28	28
Private sector	67	16	17	42	38
Employees	62	23	15	38	33
Self-employed	70	11	19	64	52

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate; PC = Pensions Commission. Individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157147

Table 3.A2.20. **The United Kingdom: Summary table for the optimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < PC's target
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	59	21	20	27	28
Low income	83	6	12	69	6
Medium income	59	22	19	21	32
High income	34	36	29	4	35
35-39	51	22	27	7	24
40-44	55	24	22	14	26
45-49	55	24	21	18	25
50-54	59	23	17	27	30
55-59	65	19	16	47	34
60-64	75	13	12	67	32
Men (single)	58	17	24	38	40
Women (single)	72	18	10	53	26
Public sector	50	36	14	16	21
Private sector	62	16	23	26	28
Employees	58	23	19	24	25
Self-employed	65	11	24	45	43

Notes: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate; PC = Pensions Commission. Individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157152

3.A2.6. The United States

Table 3.A2.21. **The United States: Values of parameters for each scenario**

	Pessimistic	Intermediate	Optimistic
Inflation	4%	2%	2%
Productivity growth	0.7%	1.5%	2.7%
Real rate of return	1%	3.5%	6.1%
Real discount rate	0.4%	2.0%	3.7%
Age of retirement	62	65	Official

StatLink http://dx.doi.org/10.1787/888933157168

Table 3.A2.22. **The United States: Summary table for the pessimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 54%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	64	14	22	48	58
Low income	85	6	9	89	20
Medium income	66	14	20	51	61
High income	47	19	34	10	75
35-39	68	11	21	50	67
40-44	65	12	23	47	61
45-49	64	14	22	46	62
50-54	64	14	22	49	61
55-59	61	17	23	46	50
60-64	66	15	19	48	44
Men (single)	71	13	15	66	50
Women (single)	76	9	15	78	54
Public sector	52	25	23	29	48
Private sector	66	12	22	49	64
Employees	62	15	22	44	60
Self-employed	69	8	22	57	60

Note: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. Individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers and between employees and self-employed people.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157177

Table 3.A2.23. **The United States: Summary table for the intermediate scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 54%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	64	13	23	29	40
Low income	84	6	10	84	12
Medium income	65	13	22	25	41
High income	47	18	35	2	57
35-39	66	11	24	29	45
40-44	64	12	24	25	45
45-49	63	13	23	28	44
50-54	64	13	23	30	43
55-59	61	15	23	27	30
60-64	67	14	19	35	32
Men (single)	70	13	17	50	37
Women (single)	75	9	16	61	40
Public sector	52	24	24	13	28
Private sector	65	11	24	29	44
Employees	62	14	24	25	40
Self-employed	69	8	23	37	47

Note: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. Individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers and between employees and self-employed people.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157187

Table 3.A2.24. **The United States: Summary table for the optimistic scenario**

In per cent

	Potential pension income composition			Proportion of individuals with income < recent retirees	Proportion of individuals with final earnings RR < 54%
	PAYG/public pension	FP based on rights	FP based on assets		
All individuals	60	12	28	19	28
Low income	82	5	13	71	10
Medium income	61	12	26	12	29
High income	41	17	42	0	38
35-39	60	11	29	15	29
40-44	60	11	29	14	30
45-49	58	12	29	19	27
50-54	60	12	28	18	30
55-59	58	15	28	20	26
60-64	64	14	22	29	28
Men (single)	67	12	21	40	32
Women (single)	73	8	19	49	32
Public sector	47	23	29	6	16
Private sector	61	11	29	17	32
Employees	57	14	29	14	28
Self-employed	66	7	27	25	37

Note: PAYG = pay-as-you-go; FP = funded pensions; RR = replacement rate. Individuals not in employment at the time of the data collection are not included in the classification between public and private sector workers and between employees and self-employed people.
Source: Authors' own calculations.

StatLink http://dx.doi.org/10.1787/888933157198

ANNEX 3.A3

Brief description of the pension systems for the coutriers covered

3.A3.1. Chile

The new solidarity pillar (NPS), introduced by the 2008 reform, has two programmes named the basic solidarity pension (PBS) for non-participants in the contributory DC system and the pension solidarity supplement (APS) for individuals entitled to a DC pension. While the former is a flat benefit, the latter complements self-funded pension income up to a ceiling called the maximum pension with solidarity supplement. Both the PBS and the APS are means tested and have residence requirements. These programmes pay benefits to individuals older than 65.

Private and public sector employees who entered the labour market after 1st January 1981 are required to participate in a private pension scheme. The pension system is DC in nature and contributory. Participation is not mandatory for the self-employed,[1] the unemployed, those in the informal sector or those who are covered by the old system. Those who moved from the old public DB system to the new private DC system received credits for former contributions known as transferable Recognition Bond (RB). By law, workers must contribute 10% of their monthly earnings, plus an additional contribution (currently between 1.62% and 2.69% of monthly earnings) to cover administrative costs as well as disability and survivor insurance. A child subsidy is given to women for each born or adopted child which is equivalent to the contribution of a worker receiving the full-time minimum wage for 18 months. Retirement benefits can be paid as annuities, programmed withdrawals or temporary income with deferred life annuity. Workers cannot receive their pensions until the legal age of retirement (60 for women and 65 for men), but early retirement is allowed under some conditions.[2]

Finally, both employees and self-employed are allowed to contribute in the voluntary private pension system. As the mandatory private pension system, it operates on the basis of individually funded DC accounts. Members can transfer all or part of the funds to the mandatory account when they retire, in order to increase the amount of their pension. Additionally, they are allowed to withdraw their voluntary savings at any point in their working life, but withdrawals are subject to a special tax and are considered as income in the year in which they take place.

3.A3.2. France

The French PAYG public pension system is characterised by a relatively high degree of occupational fragmentation. The general regime covers all private-sector wage-earners and provides a basic pension which replaces a maximum of 50% of the 25 years of highest pay under ceiling. A full pension is provided to workers who have reached both the full rate duration of insurance (set at 41.5 years for workers born in 1955 and evolving in parallel with gains in life expectancy) and the minimum legal pension age (62 years for people born from 1955), or to workers who have reached the age of the full age pension (67 years for people born from 1955). The basic pension is complemented by mandatory PAYG pension schemes established by the AGIRC-ARRCO national collective agreement (ARRCO for all categories of employees and AGIRC for managerial and executive staff only). These are point schemes in which benefits are linked with the amount of contributions paid into the system.

Civil servants and employees of public-sector companies are covered by special schemes and receive pensions replacing a maximum of 75% of the wage level in the last six months of the worker's career. Farm workers, employees in selected private companies (e.g. train and subway drivers) and the self-employed also have their own regime.

To be eligible for a pension, employees need to reach the minimum statutory retirement age. Except for some special schemes and cases, the minimum retirement age is gradually increasing from 60 for people born before the 1st of July 1951 to 62 for people born from 1955.

Next to these contributory schemes, the French pension system offers two types of minimum pensions. One is a non-contributory minimum pension for which all residents above the age of 65 are potentially eligible after a means test. The second one, part of the public basic scheme, is a minimum pension for a full career (called contributory minimum) which is offered only to workers who have contributed enough years to get a full rate basic pension.

Although not very widespread, funded pension plans also exist in France. Most voluntary occupational pension plans are of the DC type (PERCOs, PEREs and "article 83" plans). Only "article 39" plans are DB arrangements, usually for top management employees. Personal pension plans include PREFON (for civil servants) and Madelin (for the self-employed and farmers) regimes, as well as PERPs and PEPs.

3.A3.3. The Netherlands

The public PAYG pension system (first pillar) provides a flat-rate pension benefit as from the statutory age of retirement of 65. All persons residing in the Netherlands are eligible, including civil servants and the self-employed. Insured persons contribute 17.9% of their salary towards their old-age pension benefits, while employers do not contribute.[3] The full pension is paid to those who have resided in the country between the age of 15 and 65, while the pension is reduced by 2% for each year outside the country. Couples who have lived in the country between the age of 15 and 65 each receive 50% of the net minimum wage, and single pensioners receive 70% of the net minimum wage. The state also provides social assistance benefits to increase pension benefits up to the social minimum for pensioners with low income and almost no wealth. The statutory age of retirement has started to increase by one month as of January 2013 and will gradually increase to 66 in 2019 and 67 in 2023.

Participation in an occupational pension plan (second pillar) is due to collective agreements that ensure a quasi-mandatory coverage of more than 90% of the employed population. Besides, sector's employers can request the Ministry of Social Affairs and Employment to declare membership obligatory if the employer organisations making the request represent at least 60% of employees in the sector. Such obligatory arrangements apply to about 66% of the employed population.[4] Occupational pension plans can be DB or DC. The vast majority of employees (over 90%) are covered by DB plans. The majority of these plans are career-average DB schemes; some plans are final salary plans; a small number of plans combine the two or provide fixed amounts. Most plans were switched to career-average DB schemes after 2003. From 1 January 2015, the maximum yearly accrual rate for career-average plans is set at 1.875% of earnings for each year of service. Using this percentage, a maximum pension of 75% career-average earnings can be realised after 40 years of service.[5] Contribution levels for employers and employees are determined by collective bargaining, though the employers' share generally represents three-quarters of total contributions. Occupational pensions are integrated with the public pension system. The current tax rules allow a maximum benefit of 100% of final earnings at 65 from both public and private systems. Most schemes have a target total (public plus occupational) replacement rate of 70% of career-average earnings, so that only part of the salary serves as a basis to build occupational pension rights (a franchise amount is subtracted from the salary). The age that forms the basis for the determination of the pension benefits will increase from 65 to 67 as of 2014.

Everyone can buy individual voluntary private personal pension plans (third pillar). These pension arrangements are especially useful for the self-employed, who usually do not build up pension claims at an occupational pension fund and receive fiscal incentives to buy them. They can also be used to supplement accrued rights in an occupational pension plan. The maximum level cannot exceed the maximum level obtainable in the second pillar. These plans are of the DC type.

3.A3.4. Norway

The Norwegian pension system, reformed in 2011, combines a PAYG public pension system with occupational pension schemes (either PAYG-financed or funded) and partially funded collectively negotiated pension schemes. Individual pension savings have a very limited role in the overall Norwegian pension system.

The public pension system is based on yearly accruals of 18.1% of pensionable income in a notional account. This account is managed by the state and accruals are updated yearly following the general wage increase in the society (called based amount G). Pensions can be withdrawn between the ages of 62 and 75 and be combined with work. Additional income from work after 62 and until 75 years generates new pension accrual. People born before 1962 are either fully (for those born before 1954) or partially under the old pension system. The old system was based on the 20 best income years after 40 years of membership, with a fixed pension age of 67 years old. The public pension system also provides a minimum pension of 2 G for single individuals and 1.85 G per person for married couples.

Since 2011, a life expectancy adjustment of the public pension has been introduced for new old-age pensioners. The life expectancy adjustment is determined for each cohort, based mainly on remaining life expectancy. The factors are determined when the cohorts

are 61 years, and will not be adjusted later. Each cohort receives a set of separate life expectancy divisors from the age of 62 until the age of 75, depending on when they retire. At the time of retirement, the annual pension is calculated by dividing the accumulated pension entitlements by the corresponding life expectancy divisor. The pension benefit is thereafter indexed to wages, reduced by a fixed factor of 0.75% a year.

Historically, about 30% to 40% of private sector workers have been covered by voluntary occupational DB schemes aiming at 66% of final salary (including an estimated state pension) after 30 years of contributions. Occupational DC schemes were introduced in 2001, but coverage did not increase significantly. Occupational pensions became mandatory for private sector employees in 2006 (employers had until the 1st of January 2007 to set a plan) with minimum employer contribution of 2% of the salary exceeding 1 G. For both DB and DC schemes, standard retirement age is 67 for men and women and pensions are actuarially adjusted for earlier (as from 62) or later retirement (up to 75).

All public sector workers are covered by occupational DB arrangements, which can either be PAYG-financed (for state employees) or funded (for municipality workers). The DB scheme is fully integrated with the public pension system, meaning that it provides the promised total pension level, independently of the actual level of public pension. The full pension (66% of final salary) is paid after 30 years of contributions at 67 years old. An early retirement scheme was introduced for public sector employees in 1989 and allows them to retire from the age of 62.

The collectively negotiated labour market pension system (AFP) was transformed into an old-age pension system for private sector employees with the reform of 2011. Before the reform, it was a separate early retirement plan from 62 to 67 years old. The AFP covers around 50% of private sector employees. It is partially funded. Pensions are paid out from 62 for the retiree's entire remaining lifetime with the same incentive to work longer (until 75) as in the public pension system. Pension payments can only be done to individuals employed in a company covered by the AFP system during 7 out of the last 9 years before age 62 as well as the last three years before retirement. If this requirement is met, the individual accumulates pension rights equal to 0.314% of income each year from the age of 13. At retirement the sum of these rights is transformed into a lifelong benefit.

Personal pension arrangements also exist in Norway and include Individual Pension Agreement (IPA) and Individual Pension Saving (IPS). They are however of limited importance in the overall pension system (around 10% of the population is covered).

3.A3.5. The United Kingdom

State pension provision has two tiers in the United Kingdom: the basic State Pension and the additional State Pension.[6] The amount of basic State Pension people get at State Pension age is based on their National Insurance contribution record over their working life, from age 16 to State Pension age. For people reaching State Pension age on or after 6 April 2010, the number of qualifying years needed to get a full basic State Pension (full rate GBP 110.15 per week for 2013/14) is 30, for both women and men. At least one qualifying year of paid or credited contributions is needed to give right to some basic State Pension. Each qualifying year of paid and credited contributions will be worth 1/30th of the full basic State Pension, up to a limit of 30/30ths.

The second tier provision of state pension has existed in three different schemes since 1961: the Graduated Retirement Benefit between 1961 and 1975, the State Earnings-Related

Pension Scheme (SERPS) between 1978 and 2002, and the State Second Pension (S2P) since April 2002. The additional State Pension is earnings-related and payable from State Pension age. Self-employed people and unemployed do not earn entitlements. Since the introduction of SERPS in 1978 it has been possible for employers to set-up a private pension scheme that is contracted-out of SERPS/S2P. All employees who are members of a private pension scheme can be contracted-out, as long as certain conditions are met. Both the employer and employee pay lower National Insurance contributions. Each year, instead of accruing a pension within SERPS/S2P the individual earns benefits within the private pension scheme.

The State Pension age corresponds to the age from which public pensions are paid. For men born before 6 December 1953, the current State Pension age is 65. For women born before 6 April 1950, the current State Pension age is 60. Since the Pensions Act 1995, several increases have been implemented to the State Pension age as described below. For women born after 5 April 1950 but before 6 December 1953, their State Pension age increases gradually from 60 to 65. From December 2018, under the Pensions Act 2011, the State Pension age for both men and women will start to increase to reach 66 in October 2020. These changes affect men and women born on or after 6 December 1953. Under the current law the State Pension age will increase to 67 between 2034 and 2036 and to 68 between 2044 and 2046. These changes affect people born on or after 6 April 1968.

Private pension arrangements can take the form of occupational (either DB or DC) and personal plans. People may also be able to add to the benefits payable from their occupational pension scheme by paying extra contributions into an AVC scheme (Additional Voluntary Contributions). AVC schemes are of the DC type. Since 2012, employers have to automatically enroll their staff into a workplace pension if they meet certain criteria. Automatic enrolment is being staged in over a period of six years, which started with the largest employers in 2012. Most employers are likely to use a DC scheme for automatic enrolment.

3.A3.6. The United States

The PAYG public pension system covers all gainfully occupied persons, including the self-employed. Insured persons and employers contribute each 6.2% of earnings/payroll (the self-employed pay 12.4% of earnings). Workers earn a "credit" for each quarter of work and need at least 40 credits to be eligible to social security benefits (i.e. 10 years). Earlier years' earnings are revalued up to the year the recipient reaches age 60 in line with growth in economy-wide average earnings. The basic benefit is computed for payment at age 62. Thereafter, the basic benefit is adjusted in line with prices. The benefit is based on the Average Indexed Monthly Earnings (AIME), which correspond to career-average earnings for the 35 highest years of earnings, after revaluing, including years with zero earnings if needed to total 35 years. The benefit formula is progressive, with different replacement rates for different AIME bands (90% for the first USD 767 of the AIME, 32% for the amount between USD 767 and USD 4 624, and 15% for any amount in excess of USD 4 624 up to the earnings ceiling).[7] Upon the insured person's retirement, a dependant's allowance of 50% of the insured's entitlement is paid to his/her spouse when s/he has built up a smaller entitlement. A reduced early pension is available from age 62, with benefits reduced by 5/9 of one per cent per month of receipt before the full age of retirement for the first 36 months and then by 5/12 of one per cent for each additional month thereafter. The full age of retirement gradually increases since 2000 from age 65 until it reaches age 67 in 2022. The

pension may also be deferred, in which case benefits are incremented by 2/3 of one per cent for each month up until age 70. A means-tested old age supplemental income benefit, so-called Supplemental Security Income (SSI), is also available to those aged 65 or older, the blind, the disabled and for people with low income and limited resources. Generally, the maximum Federal SSI benefit changes yearly. Effective 1 January 2014, the Federal benefit rate is USD 721 for an individual and USD 1 082 for a couple. State administrations may increase these federal benefits.

Single employers, or a group of employers, may voluntarily establish a complementary occupational pension plan for their employees. If employers offer a DB plan, participation is automatic and thus compulsory for covered employees. In the case of DC plans, participation may be automatic or voluntary for covered employees. Employers are not required to cover all employees, although they must meet minimum employee coverage and non-discrimination rules. A typical DB plan would offer 1.5% of final average earnings for each year of service. A typical DC plan would offer employer-matching contributions of 50% of any employee contributions up to 6% of earnings. All types of plans are usually non-contributory for employees, except 401(k) plans that give employees the right to make contributions. Employers are required to contribute to all types of plans, except 401(k) plans, where levels of employer contributions often depend on the level of employee contributions (matching contribution).

Voluntary personal pension plans usually take the form of Individual Retirement Arrangements (IRAs). They are DC in nature.

Notes

1. Contributions will become mandatory for the self-employed as of 2015.
2. Workers can retire early, at any age, only if they can demonstrate that their early retirement benefit will be at least 80% of the maximum pension with solidarity payment and 70% of their average monthly earnings over the last ten years.
3. The contribution rate of 17.9% is paid only out of the salary with a ceiling defined by the maximum income in the second tax bracket. In addition, part of the public pension benefits is paid out of the general income tax.
4. Such arrangements are administered by mandatory branch pension funds. Employers may opt out of an occupational plan if they offer a provision that promises equal or better benefits. The pension schemes of the remaining employed population are administered by non-mandatory branch pension funds, company pension funds, second pillar insurance contracts and the pension funds for professional schemes.
5. Before 1 January 2014, the maximum yearly accrual rate for career-average plans was 2.25% of earnings for each year of service (leading to a maximum pension of 90% of career-average earnings after 40 years of service). From 1 January 2014, this maximum was set at 2.15% (leading to a maximum of pension of 86% of career average earnings after 40 year of service) and from 1 January 2015 this maximum will be 1.875%. The maximum yearly percentages for final pay schemes are 2% before 1 January 2014, 1.9% between 1 January 2014 and 31 December 2014 and 1.66% from 1 January 2015. In all situations, previous accrued rights are respected.
6. The analysis for the United Kingdom has been carried out before enactment of the Pensions Act 2014, which contains provisions to implement the single-tier State Pension. This description refers to the pension system as it was before the reform to be consistent with the analysis in this chapter. The single-tier pension will replace the current basic State Pension and additional State Pension with a flat-rate pension for people who reach State Pension age on or after 6 April 2016.
7. The values are those that apply for insured persons reaching age 62 in 2012.

Chapter 4

Increasing private pension coverage and automatic enrolment schemes: Evidence from six OECD countries

This chapter describes automatic enrolment schemes in six OECD countries and assesses their success in raising private pension coverage. The chapter first identifies elements of the design of automatic enrolment schemes that may influence coverage outcomes: target population, opting-out window and re-enrolment process, contribution rates, financial and non-financial incentives and other plan characteristics. The chapter then discusses the importance of communication and education campaigns that accompany the launch and implementation of automatic enrolment; it stresses the importance of considering the interaction of automatic enrolment with other existing incentives; and it evaluates the costs of automatic enrolment for employers and the state.

4.1. Introduction

Automatic enrolment is gaining popularity as a mean to increase participation in funded private pension plans. It involves signing up people automatically to private pension plans but giving them the option to opt out within specified timeframes. Automatic enrolment aims to harness individuals' inertia in thinking about retirement and pension saving, while preserving individual choice and responsibility for the decision about whether to save in a private pension arrangement. So far, it is encouraged by regulation in Canada and the United States and it is organised at the national level in Chile, Italy, New Zealand and the United Kingdom.

The automatic enrolment schemes already in place in these OECD countries vary in many aspects, including their design, the incentives used to avoid large number of opt-outs and the context in which they operate. These factors may have an impact on the success of automatic enrolment programmes in raising coverage in private pension plans. Looking at the experience of countries where such programmes have already been implemented could help other countries decide whether automatic enrolment would suit them and learn about which elements may increase the chances of success.

This chapter therefore describes the main factors affecting the success of automatic enrolment schemes in raising private pension coverage. It also assesses the costs of such schemes for employers and the state. The analysis draws on the experience of implementing automatic enrolment in six OECD countries (Canada, Chile, Italy, New Zealand, the United Kingdom and the United States). The available evidence in these countries shows that automatic enrolment has a positive impact on coverage. The relative success of automatic enrolment mainly depends on its design, in particular on its default options, the communication and education campaigns that accompany its launch and implementation, and the interaction with other existing incentives. Employers have an essential role to play and can incur compliance and contribution costs. Costs to the state mainly relate to subsidies and matching contributions.

Section 4.2 describes the automatic enrolment schemes in Canada, Chile, Italy, New Zealand, the United Kingdom and the United States and looks at the evolution of private pension coverage in these countries following the introduction of automatic enrolment. The evidence shows an improvement in coverage in all countries. Section 4.3 identifies elements of the design of automatic enrolment schemes that may influence coverage outcomes. In particular, the section assesses the potential impact of the target population, the opting-out window, contribution rates, financial and non-financial incentives, and other pension plan characteristics, including default options. Section 4.4 then shows that communication and education campaigns developed to accompany the launch and implementation of automatic enrolment can help in raising coverage rates by increasing awareness of, and compliance to the reform among individuals and employers. Section 4.5 warns that the interaction of automatic enrolment with other existing incentives may compromise its success in increasing coverage rates. Section 4.6 assesses the costs of

automatic enrolment for employers and the state using available data for New Zealand and the United Kingdom. Finally, Section 4.7 concludes by listing the main elements for a consistent policy strategy for automatic enrolment programmes to succeed in increasing coverage of private pension plans.

4.2. Automatic enrolment has a positive impact on private pension coverage

This section looks at the impact of automatic enrolment programmes on coverage. It does so by analysing the experience in six OECD countries where automatic enrolment has been introduced in recent years.

Table 4.1 briefly describes the automatic enrolment schemes in place in Canada, Chile, Italy, New Zealand, the United Kingdom and the United States. The automatic enrolment scheme is set up at the national level in Chile, Italy, New Zealand and the United Kingdom, while in Canada and the United States employers can choose to set up such a scheme for their employees or to incorporate automatic enrolment provisions in their existing scheme. In the case of Chile, automatic enrolment is for a limited period of time and only for self-employed workers. The Chilean authorities plan to make enrolment compulsory for them in 2015.

Table 4.1. **Description of automatic enrolment schemes**

Country	Description
Canada	A Pooled Registered Pension Plan (PRPP) is a kind of multi-employer defined contribution pension plan in which unrelated employers and self-employed persons are eligible to participate. Where an employer elects to offer a PRPP, enrolment of employees would be automatic unless an employee chooses to opt out. The PRPP framework, introduced in 2012 at the federal level, will be fully in place across Canada pending provincial enabling legislation. So far, four provinces have introduced PRPP legislation.
Chile	The pension reform of 2008 establishes the obligation for self-employed workers to contribute to the private pension system, starting from 1 January 2012. Their participation was voluntary before that date. The law stipulates a gradual process of pension system affiliation and mandatory contributions between 2012 and 2014. During this period, pension contributions will be paid from the tax rebates owed to the workers unless the latter explicitly state that they do not wish to pay contributions. From 2015, all eligible self-employed workers will have to contribute with no possibility to opt-out.
Italy	Automatic enrolment was introduced in January 2007. For all private sector employees, it involved the payment into pension funds of the future flow of the severance pay contributions (Trattamento di fine rapport, TFR), set at 6.91% of salary. Individual workers were given a period of six months in order to decide whether to opt out of this arrangement, keeping their rights regarding the TFR as in the past. The same mechanism applies since then to all first-time private sector employees.
New Zealand	KiwiSaver was introduced on 1 July, 2007. Employers must enrol new employees (i.e. those starting a new job) into the scheme and individuals have maximum 8 weeks to opt out. The minimum contribution is 3%, which is deducted from employee earnings, and an employer contribution of 3% of salary is added. The government also contributes 50 cents for every dollar of member contribution annually up to NZD 521.43 and "kick-starts" each individual account with NZD 1 000. Existing employees not subject to the automatic enrolment rule can also join (opt in) the KiwiSaver plan on a voluntary basis.
United Kingdom	Automatic enrolment was introduced in 2012 for all those workers who are not already covered by a private pension arrangement. Employers are required to automatically enrol their eligible jobholders into a qualifying workplace pension. The duty on employers is being staged in between October 2012 and February 2018, starting with the largest employers. Employer and employee contributions are being phased in from October 2012 to a minimum total contribution of 8% of qualifying earnings by October 2018.
United States	Automatic enrolment in 401(k) pension plans was introduced in 1998 for newly hired employees. In 2000, automatic enrolment was extended to current workers who were not enrolled in a pension scheme. In 2006, the adoption of the *Pension Protection Act* greatly encouraged automatic enrolment by giving employers more certainty regarding the regulatory treatment of automatic enrolment schemes and establishing some simplified requirements for fulfilling these.

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The increase in private pension coverage following the introduction of automatic enrolment has been significant in Italy, New Zealand and the United Kingdom. In Italy, according to COVIP, the Italian pension supervisor, the reform involved about 12.2 million

private-sector employed workers and several hundreds of thousands of companies in 2007. In the space of one year, as shown in Figure 4.1, the working-age population coverage rate increased from 8.5% to 11.9%. However, automatic enrolment has had a limited impact on new membership. Out of the 1.4 million additional workers enrolled in private pensions between end 2006 and end 2007, only 72 000 people enrolled automatically (representing around 5% of new pension plan members in 2007). Subsequent increases in coverage (up to 15.9% in 2013) were mostly due to voluntary enrolment and not related to the automatic enrolment mechanism. At the end of 2013, there were 231 000 automatically enrolled members, representing 8% of new membership of private sector workers since 2007 (COVIP, 2014).

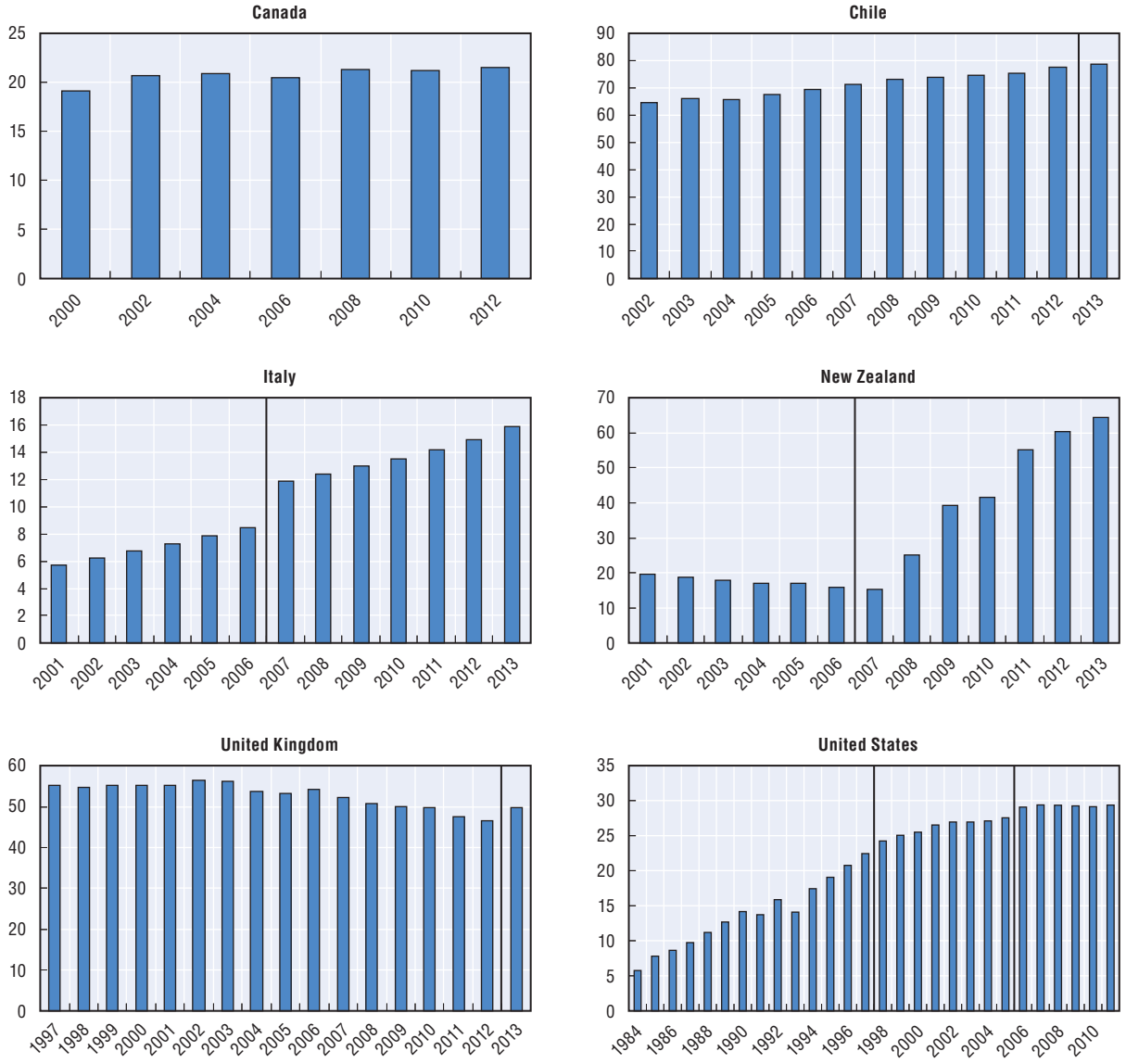
The introduction of KiwiSaver in New Zealand in 2007 reversed the previous negative trend on private pension coverage. From a low 15.2% of the population under 65 at the end of 2007, coverage of private pensions increased rapidly since then to reach 64.4% at the end of 2013.[1] Automatic enrolment is not the only way to join the KiwiSaver as people can also voluntarily opt in. So far, a large proportion of KiwiSaver members actually joined voluntarily so as to enjoy available financial incentives. According to Inland Revenue statistics, as of June 2014, people automatically enrolled only represented 39.0% of all KiwiSaver members.

In the United Kingdom, the proportion of employees in a workplace pension scheme increased in April 2013 to 50%, the first increase since 2006. In 1997, 55% of employees were members of a workplace pension scheme, falling to 47% in 2012, prior to the introduction of automatic enrolment (Office for National Statistics, 2014). According to the Department for Work and Pensions (DWP), focusing on private sector employees, their coverage rate rose from 26% in 2011 to 35% in 2013 (DWP, 2014a). This was the first increase for a decade. These numbers suggest that the introduction of automatic enrolment already had an effect in 2013. As more employers reach their staging date (see Table 4.1), the increase in coverage is expected to continue. At the end of August 2014, 27 818 employers had completed their declaration of compliance and automatically enrolled 4 426 000 eligible jobholders into a pension scheme (The Pensions Regulator, 2014a).

It is still too early to see the impact of the introduction of automatic enrolment in Canada. Indeed, following the passage of federal legislation in 2012, the first provinces to introduce Pooled Registered Pension Plan (PRPP) legislation in Canada (Saskatchewan, Alberta, British Columbia and Quebec) did so in 2013. There is no obligation for other provinces to introduce PRPP legislation. Only the federal and Quebec legislation are in force in 2014. The impact on coverage will only be observable when 2014 membership data become available. Figure 4.1 shows however that the coverage rate of private pension plans in Canada has been quite stable since 2000, at around 21% of the working-age population.

For Chile, the impact of the automatic enrolment of self-employed people does not translate into higher coverage rates when the working-age population is used as the denominator as in Figure 4.1. However, according to the Chilean Superintendence of Pensions, 304 011 self-employed individuals, representing 32% of those affected by the policy, automatically contributed to the pension system in 2013 based on their self-employment earnings of 2012. Only 11% of them did not have a defined contribution (DC) account before and became new members of the pension system (all the others were already members of the pension system). In addition, 60% had already contributed to the pension system as employees during the year, so their contributions as self-employed

Figure 4.1. **Coverage of private pension plans before and after the introduction of automatic enrolment**



Note: Coverage is measured as the number of people enrolled in a pension plan (i.e. having assets or accrued benefits in a plan) and expressed as a percentage of the working-age population (aged 15 to 64), except for New Zealand (as a % of people under 65) and the United Kingdom (as a % of total employees). Data refer to all private pension plans, except for the United Kingdom (only workplace pension plans) and the United States (only 401(k) plans). Numbers may include multiple counting as individuals may be enrolled in several pension plans at the same time. The blue line represents the introduction of automatic enrolment.

Source: Canada, Chile, Italy and New Zealand: OECD Global Pension Statistics; United Kingdom: ONS (2014); United States: US Department of Labor (2013).

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came to fill the gap of contributions for the total income earned (as employee and self-employed).[2] Preliminary data show that 254 295 self-employed individuals contributed in 2014 for their self-employment earnings of 2013. The objective of the automatic enrolment programme in Chile is therefore more to increase the number of people contributing permanently and for their total earnings to the pension system rather than to increase coverage (which already stood at around 77% of the working-age population before the reform thanks to the compulsory enrolment of employees).

Following the adoption of the *Pension Protection Act* (PPA) in 2006, membership in 401(k) plans has remained broadly constant in the United States. According to the US Department of Labor (2013), since 2005, coverage increased from 27.5% of the working-age population to 29.1% in 2006 and 29.4% in 2011. Although, at the aggregate national level, the impact on coverage of automatic enrolment may seem to be small, there is a lot of literature in the United States documenting the positive impact of automatic enrolment on participation rates at the company level. For example, the US Government Accountability Office (GAO) reviewed available reports and data about the effect of automatic enrolment policies.[3] According to studies they reviewed, automatic enrolment policies resulted in considerable increases in 401(k) participation rates for plans adopting them, with some participation rates reaching as high as 95%. For example, one study followed comparison groups hired before and after a company adopted automatic enrolment for new employees only and compared the participation rates of the two groups. The participation rate for those hired before automatic enrolment was adopted was 37% at 3 to 15 months of tenure, compared with an 86% participation rate for the group hired after automatic enrolment with a similar amount of tenure. One of the reasons why the impact of automatic enrolment at the company level is not visible at the aggregate national level may stem from the fact that many companies introduce automatic enrolment for new employees only, leaving existing employees outside the programme.[4] In addition, private pension coverage in the United States is contingent on employer sponsorship and strongly correlated on earnings, age and other factors that may have had a greater impact on coverage rates than the new automatic enrolment regulation during the period subsequent to the enactment of the PPA, which coincides with the more widespread impact of the global financial crisis beginning in 2007.

Figure 4.1 shows that automatic enrolment generally has a positive impact on coverage. However, automatic enrolment has not allowed yet reaching coverage rates at par with those found in mandatory systems. OECD (2012) shows that countries with mandatory private pension arrangements (e.g. Australia, Estonia, Finland, Iceland, Sweden or Switzerland) have coverage rates around or above 70% of the working-age population. In addition, the countries analysed have experienced different levels of increase in coverage rates. For example, seven years after the introduction automatic enrolment, coverage of private pension plans has increased by 48.6 percentage points in New Zealand (from 15.8% in 2006 to 64.4% in 2013) and only by 7.5 percentage points in Italy (from 8.5% in 2006 to 15.9% in 2013). The success of automatic enrolment schemes in reaching high levels of coverage is therefore not guaranteed and depends on the design of those schemes, in particular their default options, the effectiveness of communication and education campaigns, and the interaction with other existing incentives.

4.3. The design of automatic enrolment schemes can influence coverage outcomes

This section identifies elements of the design of automatic enrolment schemes that may have an impact on the success of these schemes in raising coverage rates. It compares and assesses how certain features of these schemes, the target population, the opting-out window, the contribution rates, the incentives and other pension plan characteristics in the six countries covered may influence people's behaviour to avoid high opt-out rates. Particular attention is given to default options, as these are likely to play an important role in determining the pension income for many individuals unwilling or unable to make choices.

4.3.1. *Target population*

Policy makers, when designing automatic enrolment schemes, need to clearly define who are the people that need higher private pension coverage. This target population should be defined according to each country-specific goals and situation, and taking into account the overall structure of the pension system.

Different countries have different criteria to define their target population. Table 4.2 compares the target population of the automatic enrolment schemes and shows that criteria such as employment status, job seniority, age and earnings level are currently used in the six countries covered.

Table 4.2. **Definition of the target population for automatic enrolment schemes**

Country	Target population for automatic enrolment
Canada	All full-time employees and part-time employees having at least 24 months of continuous employment
Chile	Self-employed workers who personally carry out an activity by which they obtain work income taxed under Article 42 No. 2 of the *Income Tax Law*. All male workers who are at least 55 years of age, and female workers who are at least 50 years of age, as of 1 January 2012, are exempt, as well as self-employed workers who have an early retirement benefit or those who are members of a pension institution of the old pay-as-you-go system, of the Social Security Department of the Chilean Police Force (DIPRECA) or of the National Defence Social Security Fund (CAPREDENA).
Italy	All private sector employees in January 2007. All first-time employees afterwards.
New Zealand	New employees aged from 18 to 64 years
United Kingdom	Employees aged at least 22 and under state pension age, and earning over GBP 10 000 in 2014/15 terms
United States	Employees eligible to participate in the plan sponsored by the employer (typically those over the age of 21 with one year of service)

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In all the countries covered except Chile, only employees can be automatically enrolled in a private pension plan. Chile is the only country where the automatic enrolment programme is directed towards self-employed workers as employees are already mandated to contribute to the pension system. It was introduced for a limited period of time (three years) for workers in a certain tax category in the context of mandatory participation of the self-employed in the pension system from 2015 onwards.[5] In Canada, New Zealand and the United Kingdom, self-employed workers can voluntarily join automatic enrolment schemes by contracting directly with a plan provider.[6]

Countries can also use job seniority as a criterion to select the target population. However, when assessing the impact of automatic enrolment on coverage, it is important to bear in mind that limiting the target population (for example to new employees) may reduce the potential positive impact on overall coverage rates. In Canada, Italy and the United Kingdom, all employees are automatically enrolled (pending other eligibility criteria in some cases). In New Zealand, only new employees are part of the target population. In the United States, while the regulation in place allows employers to automatically enrol all of their employees, many use automatic enrolment only for new employees (see PSCA, 2011). In addition, in both Canada and the United States, some employees need to fulfil a minimum length of service to enrol into the plan.[7]

Countries may establish a minimum entry age for the automatic enrolment scheme and may also exclude workers after a certain age. When defining an entry age, regulators should however keep in mind that people should contribute for long enough periods and therefore the system should encourage people to start contributing early and for as long as they wish to. A minimum entry age exists in New Zealand (18 years old) and the United

Kingdom (22). In the United States, employers are permitted to exclude workers younger than 21 from participation in their pension plan. Chile, New Zealand and the United Kingdom exclude older workers from the automatic enrolment scheme. In Chile, self-employed workers within ten years from retirement are exempted from contributing to the pension system. In New Zealand, people above the age of eligibility for a public pension (currently 65) cannot join KiwiSaver. In the United Kingdom, employees over state pension age cannot be automatically enrolled, but employees over state pension age and under age 74 have the right to opt into a pension arrangement scheme if they wish to do so. While the amount of assets accumulated by older workers entering an automatic enrolment scheme is likely to be relatively small, older workers may still receive good value on their pension contributions from staying enrolled. The Pensions Policy Institute (PPI, 2014a) shows that over 95% of older workers (aged over 50) in the United Kingdom identified as eligible for automatic enrolment are expected to see a rate of return on their pension contributions above a benchmark investment return of 6%, even after the effect of means-tested benefits and taxation has been taken into account.

Some countries also establish as an entry criterion a certain level of earnings (e.g. Chile and the United Kingdom). Entry earnings levels are established to exempt low-income workers from contributing in private pension plans, because they may already enjoy high replacement rates from the public pension system or because making pension contributions may not be affordable for them. In Chile, the annual covered earnings considered for contributions by self-employed workers correspond to 80% of the total gross income subject to Article 42 n°2 of the *Income Tax Law* obtained by the worker during the calendar year prior to the tax statement and cannot be lower than one minimum monthly wage. In the United Kingdom, only workers earning over GBP 10 000 in 2014/15 earnings terms are eligible to be automatically enrolled by their employer. This threshold is reviewed by the government each year and is designed to exclude people from automatic enrolment where their income level makes it less likely that automatic enrolment will benefit them. It needs to be determined carefully to avoid excluding people that would need complementary pension savings.

Finally, it is worth noting that some countries allow people outside the target population to voluntarily opt into the automatic enrolment scheme. This is the case in Chile, where self-employed individuals outside the scope of the automatic enrolment mechanism can voluntarily contribute to the pension system. In Canada, self-employed individuals or individuals whose employer chooses not to participate in the plan can enrol themselves into a PRPP of their choice. In New Zealand, existing employees, self-employed individuals, people not working and even children under the age of 18 can voluntarily opt in a KiwiSaver plan. As at June 2014, more than 60% of KiwiSaver members were actually people who had voluntarily joined, either through their employer or through a provider. In the United Kingdom, non-eligible jobholders (aged between 16 and 21 or aged between state pension age and 74, and earning above GBP 10 000 a year; or aged between 16 and 74 and earning between GBP 5 772 and GBP 10 000) have the right to opt in an occupational plan, with the employer required to pay contributions on behalf of workers in these categories. In addition, entitled workers (those aged between 16 and 74 and earning below GBP 5 772) can also voluntarily opt in to a scheme but their employer is under no obligation to pay any contributions to them.

4.3.2. *Opting-out window and re-enrolment*

Automatic enrolment is designed to maximise private pension coverage without imposing compulsion. The expectation is that, once enrolled, inertia will lead many people to remain in the scheme and make contributions. Automatic enrolment also preserves choice and the individuals' responsibility for the decision about whether to save in a pension scheme by giving them the option to opt out within a certain timeframe.

This timeframe, referred to as the opting-out window, differs across countries and could affect opt-out rates. Procrastination may indeed lead more people to stay automatically enrolled when the opting-out window is short. Table 4.3 compares the opting-out windows in the six countries with an automatic enrolment scheme. The opting-out window varies from one month in the United Kingdom to six months in Italy. In Chile, between 2012 and 2014 self-employed individuals have until the submission of their income tax declaration each year to refuse using their tax rebate to pay pension contributions for the previous year.

Table 4.3. **Definition of the opting-out window for automatic enrolment schemes**

Country	Opting-out window
Canada	Within 60 days following automatic enrolment
Chile	Until before the submission of the income tax declaration in each respective tax year
Italy	Within six months following automatic enrolment
New Zealand	Anytime between 2 weeks and 8 weeks following automatic enrolment. Contributions already made are refunded.
United Kingdom	Within one month following automatic enrolment. Contributions already made are refunded. After the opt-out period has expired, a jobholder who decides to leave the pension scheme must cease active membership in accordance with the scheme rules. Employers must automatically re-enrol their eligible jobholders who chose to opt out or cease active membership on a three-yearly cycle.
United States	Within 90 days following automatic enrolment for schemes complying with certain notice requirements. Contributions already made are refunded. After the opt-out period has expired, workers can cease membership at any time.

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The opting-out decision is irrevocable in some countries. In Canada, Italy and New Zealand, the opting-out decision can only be made once, within the opting-out window. After that period, people cannot leave the plan, except under very specific conditions (as described in section 4.3.4). There is no automatic re-enrolment process and the initial decision to stay enrolled is irrevocable. This system is straightforward and does not create too much burden on employers.

In the United Kingdom and the United States, people who choose to opt-out can reconsider their decision at regular intervals. The initial opting-out window is short, one month in the United Kingdom and typically 90 days in the United States, but people are allowed to cease membership at any time after the opting-out window is passed.[8] As allowing people to cease membership at any time may increase the number of people not contributing to a pension plan, the automatic enrolment programme in the United Kingdom requires employers to re-enrol their eligible jobholders who chose to opt out or cease membership every three years. This gives employees the opportunity to "reconsider" their finances and pension savings options in case their situation has changed since they decided to opt out. This re-enrolment system increases the chances of extending coverage, but also implies an additional burden on employers who have to keep track of each employee's status as regard membership, re-assess their workforce at regular intervals

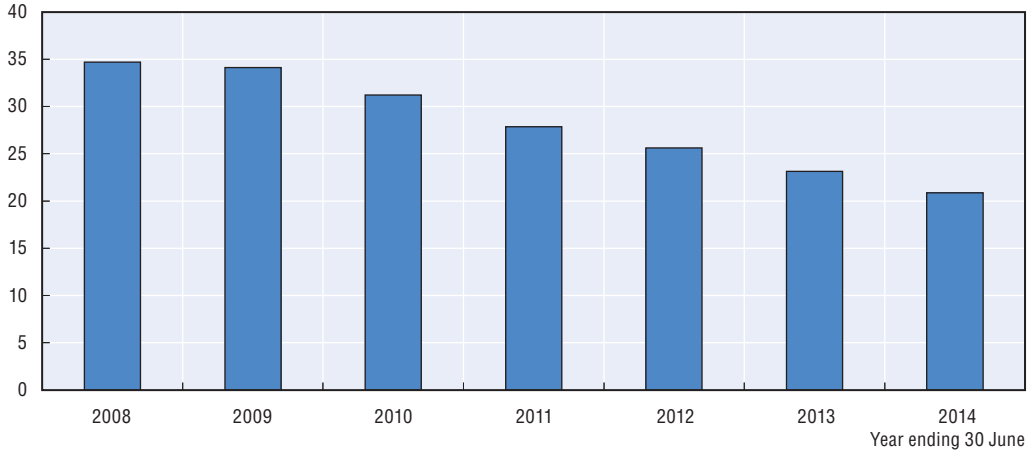
(every three years) to identify potential eligible jobholders who opted out or ceased membership, and automatically enrol them back.

Opt-out rates are only documented in Chile, New Zealand and the United Kingdom. In Chile, opt-out rates are very large, with 68% of self-employed individuals having decided not to contribute for the year 2012 and 73% for the year 2013 (preliminary data). These high rates were observed despite the fact that only part of covered earnings were taken into account for contributions (40% in 2012 and 70% in 2013).[9] One of the reasons for refusing to contribute may be the lack of willingness to lower net earnings due to the contributions to the pension system. This and other related factors explain why only around 4% of self-employed workers were covered by the pension system before 2012 and are likely relevant explanations for the high opt-out rates (Superintendence of Pensions, 2010). Indeed, both income and employment of self-employed workers are unstable, which prevents them from contributing on a monthly basis. In addition, there is a lack of information regarding the benefits of contributing to the pension system and of a "pension culture", as well as a preference for liquidity.

The percentage of individuals who opted out and remained out of the scheme has declined in New Zealand over the seven years since the introduction of KiwiSaver, from 34.7% of automatically enrolled employees by June 2008 to 20.9% by June 2014 (see Figure 4.2). According to Inland Revenue (2012a), people in a younger working-age group (18 to 44 years) with one job on lower to middle incomes (between less than NZD 10 000 and NZD 40 000 with many earning less than NZD 10 000) were more likely to have opted out. Along with not being able to afford to join, a survey undertaken on behalf of the Financial Services Institute of Australasia (2011) found a key reason that people had not joined KiwiSaver was because they had other sufficient savings and investments for retirement. Another reason that ranked highly for people not joining KiwiSaver was concerns about the stability of the structure of the scheme due to a belief that changes were likely in the future.

Figure 4.2. **Cumulative KiwiSaver opt-out rates**

As a % of all automatically enrolled individuals



Note: The cumulative opt-out rate is calculated as the ratio between the cumulative number of people who opted out and remained out of the scheme and the cumulative number of people who have been automatically enrolled by their employer.

Source: Inland Revenue administration data.

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In the United Kingdom, the Employers' Pension Provision survey conducted in 2013 found that the average opt-out rate across the participating employers was around 9-10% (DWP, 2014a). This is in line with previous research among large employers where the average opt-out rate was 9% and where most individual employers had an opt-out rate ranging from 5% to 15% (DWP, 2013). These rates are much lower than anticipated. As a result, DWP has revised its opt-out forecast from 30% to 15% for the lifetime of the automatic enrolment programme.

From the evidence available in the United Kingdom (DWP 2013 and 2014b), the main reason given for opting out is financial constraints, particularly the affordability of contributing to a pension set against other priorities. Other reasons revolve around life stage and career plans, for example proximity to expected retirement and plans to change jobs in the near future. For older workers, some felt that retirement was too close to consider a long-term saving plan or they already had sufficient provision in place. For younger workers, retirement felt too remote to consider and that they could not yet afford it. Lack of trust and understanding in pensions or preference for other forms of saving were also mentioned. Finally, some workers felt they would not be able to build up a sufficiently big pension, regardless of how long they spent paying into it, because the contribution rate was too low.

According to PPI (2014b), opt-out rates could be affected as small and micro employers reach their staging dates. Indeed, small and micro employers may not behave like large and medium employers as about 80% of them have no existing workplace pension arrangement (DWP, 2014a), and therefore no experience in tackling the administrative tasks necessary for setting up and running access to a pension scheme. In addition, they do not have the same level of finance, payroll and personnel infrastructure than large employers. Some small employers may also give workers less encouragement to stay in schemes than large employers. These factors could all affect average opt-out rates from automatic enrolment when smaller employers begin to automatically enrol their workers. However, larger employers (with 50+ workers) employ around 65% of the private sector workforce (DWP, 2014a) so higher opt-out rates among smaller employers should have less of an impact on overall participation and saving levels.

4.3.3. Contribution rates

The default rate at which contributions should be set in an automatic enrolment scheme depends on how the private pension system interacts with the public pay-as-you-go (PAYG) pension system. If the PAYG system already provides high benefits, the automatic enrolment scheme needs to aim for lower replacement rates to achieve an overall retirement income target. For example, when private pensions complement PAYG pensions and the target replacement rate for the automatic enrolment scheme is 30%, the contribution rate needed to achieve this target is much lower (5% of wages) than when private pensions are the main source to finance retirement and the target is 70% (12% of wages) (OECD, 2012).[10]

Automatic enrolment schemes can run with a universal contribution rate for all members or with variable contribution rates, including a default minimum rate for individuals unwilling or unable to choose. In both cases, it is important to set the universal contribution rate or the default contribution rate at a sufficiently high level to ensure that retirement income objectives can be met. As shown in Table 4.4, universal contribution rates are used in Chile (10% of covered earnings) and Italy (6.91% of gross wages). In New

Zealand and the United States (for specific arrangements), minimum contribution rates are defined for both the employer and the employee.[11] These minimum rates also correspond to the default contribution rates if members do not make an active choice. For example, in New Zealand, members of a KiwiSaver scheme can choose to contribute 3%, 4% or 8% of wages. The default rate is 3% and corresponds to the minimum an employee should contribute. In the United Kingdom, there is a minimum level for the total contribution rate and for the employer contribution rate for employees automatically enrolled in a DC scheme.[12] The employee only needs to pay the difference between the minimum total contribution level and the employer and state contributions (if there is a shortfall). For example, from October 2018, if an employer offers a scheme in which they contribute 6%, the employee contribution could be set at 1% and this would still meet the 8% minimum total contribution level (with 1% state contribution).

Table 4.4. **Contribution rates from employers, employees and the state**

Country	Employer	Employee	State
Canada	Voluntary	Chosen by the employee (can be as low as 0%) If no choice, the plan administrator sets a default	None
Chile	None	10% of covered earnings (gradual increase of the share of covered earnings taken into account between 2012 and 2014)	None
Italy	6.91% of gross wages plus a matching contribution if the employee contributes	Voluntary	None
New Zealand	Minimum 3% of wages	Minimum 3% of wages	Kick-start contribution of NZD 1 000 Matching contribution of 50 cents for every dollar of member contribution annually up to NZD 521.43 (tax credit)
United Kingdom	Minimum contribution: • Oct. 2012-Sept. 2017: 1% of qualifying earnings • Oct. 2017-Sept. 2018: 2% • Oct. 2018 onwards: 3%	Minimum total contribution: • Oct. 2012-Sept. 2017: 2% of qualifying earnings • Oct. 2017-Sept. 2018: 5% • Oct. 2018 onwards: 8% The employee only needs to contribute the difference (if any) between the minimum total contribution and the employer and state contributions	Tax relief: • Oct. 2012-Sept. 2017: 0.2% of qualifying earnings • Oct. 2017-Sept. 2018: 0.6% • Oct. 2018 onwards: 1%
United States	• Basic and EACA plans: voluntary • QACA: minimum matching contribution of 100% of the 1st percent of employee contributions plus 50% of contributions beyond 1% and up to 6%; or minimum 3% to all participants	• Basic: chosen by the employee • EACA: uniform automatic contribution rate for all employees • QACA: minimum 3% of wages, annual automatic escalation to 6% (maximum 10%)	None

Notes: Basic = Basic automatic enrolment 401(k) plan; EACA = Eligible Automatic Contribution Arrangement; QACA = Qualified Automatic Contribution Arrangement.

StatLink http://dx.doi.org/10.1787/888933157252

To minimise opt-out, default or minimum contribution rates could be set below the level desired initially and raised afterwards. Ideally, this could be done in an automatic manner according to a set calendar. New Zealand, the United Kingdom, and the United States have chosen this approach. In order to improve KiwiSaver's affordability, employees and their employers could initially agree to adopt a transitional contributions arrangement whereby employer contributions can be counted towards the minimum 4% employee

contributions level. Subject to conditions being met, an employer could contribute at least 2% towards the employee's minimum 4% contribution in 2008. By 2011, employees were to transition to a full 4% contribution with a matching 4% from their employers.[13] In the United Kingdom, minimum contribution levels for all DC schemes will be phased in to help both employers and individuals adjust gradually to the additional costs of the reform. Between October 2012 and October 2018, the minimum total contribution rate will rise from 2% to 8% on a band of qualifying earnings, while the minimum employer contribution rate will rise from 1% to 3%.[14] In the United States, automatic enrolment into a 401(k) plan can be accompanied by an automatic escalation of worker's contributions. For a Qualified Automatic Contribution Arrangement (QACA), the initial automatic employee contribution must be at least 3% of wages, increasing by 1 percentage point annually, so that by the fifth year, the automatic employee contribution is at least 6% of wages. The employer must match 100% of the first 1% of wages contributed by the worker, plus 50% of the next 5% of wages, for a maximum match of 3.5% of wages to each employee.[15]

Similarly, in Chile, the share of covered earnings taken into account for contributions is gradually increasing between 2012 and 2014. Self-employed individuals not explicitly expressing their will not to contribute will pay a 10% contribution rate based on 40% of their covered earnings in 2012, 70% in 2013 and 100% in 2014.

The experience of KiwiSaver provides a crucial insight into the importance of the default contribution rate. Members joining KiwiSaver before 1 April 2009 were assigned to a default contribution rate of 4%. Between April 2009 and April 2013, the default contribution rate was reduced to 2%. Inland Revenue statistics show that as of 30 June 2011, 80% of people who joined KiwiSaver after April 2009 contributed 2%, the default, while 62% of those who joined when the default contribution rate was 4%, still contributed 4%. The focal importance of the default rate and inertia are clearly at play here, showing how important it is to get the default contribution rate right. Since 1 April 2013, the default contribution rate has increased to 3%.

Employer and employee contributions are both mandatory in New Zealand, the United Kingdom and the United States (for QACAs). In the United Kingdom however, if the employer decides to pay the full minimum total contribution level (for example 8% from October 2018), then employees are not required to make any contributions under automatic enrolment regulations, although the employer may still expect them to contribute. Employer contributions are voluntary in Canada and for arrangements in the United States that do not choose to be structured as QACA plans. In Italy, employee contributions are voluntary and labour contracts applicable to most employed workers provide for an extra employer's contribution (usually in the range of 1-1.5% of gross wages) conditional on the payment into the fund of a matching contribution by the employee (see Rinaldi, 2011).

New Zealand and the United Kingdom are the only two countries where the state contributes into the automatic enrolment scheme. Those contributions take the form of a tax credit in New Zealand (50 cents for every dollar of member contribution, up to NZD 521.43 annually) and a tax relief in the United Kingdom (1% of qualifying earnings as of 2018). In addition, the state "kick starts" each individual account with NZD 1 000 in New Zealand.

There is the risk that the introduction of automatic enrolment schemes may lead to a levelling down of contribution rates in previously existing DC pension plans. If the

minimum or default contribution rates set in the automatic enrolment scheme are below those in existing plans, employers and employees may decide to align their contributions with those minima. This could damage adequacy of future retirement income if contribution rates for automatic enrolment schemes are not well aligned with the overall design of the pension system. Total contribution rates in the countries covered range from 6% in New Zealand to 10% in Chile. With 8%, the United Kingdom may experience a levelling down of contribution rates. Evidence so far, from a qualitative research with large employers (DWP, 2013), shows that the majority of employers who had already begun automatically enrolling chose to set contribution levels at the minimum required level. Some employers, however, have offered to match higher contributions (paid over the minimum) from workers. Employers using existing provision were less likely to lower contribution levels for automatically enrolled members than those offering access to a new scheme. Employers who did not offer pension provision prior to automatic enrolment were more likely to say they intended to pay the minimum required level of contributions.

4.3.4. *Financial and non-financial incentives*

Financial and non-financial incentives can be used to encourage automatically enrolled workers to stay enrolled and not opt out. Those incentives can also nudge people outside the target population of the automatic enrolment scheme to voluntarily opt in.

Historically, tax deductions and tax relief have been the main type of financial incentives provided by governments to promote private pensions. Such incentives benefit higher income households the most as they are subject to higher marginal tax rates that afford a greater tax subsidy to the same contribution. However, the largest coverage gaps are concentrated among lower and middle income households who may draw little benefit from these tax incentives. In order to encourage people in such households to stay enrolled, the countries covered also provide other kinds of financial incentives: matching contributions (from the employer and/or the state), state flat subsidies and guarantees.

In Italy, New Zealand and the United Kingdom, the employer has to make contributions. In the United States, these are strongly encouraged through the provision of simplified compliance requirements that require employer contributions for a plan to qualify for preferential tax treatment. Minimum employer contributions are around 3% in these countries, except in Italy where voluntary employee contributions are matched by an employer contribution around 1-1.5% of gross wages (on top of the TFR flows). Contributions from the state can also be found in New Zealand and the United Kingdom.[16]

People participating in a KiwiSaver plan in New Zealand can benefit from two different types of state flat subsidies: the "kick start" contribution of NZD 1 000 at the opening of the account and the first-home deposit subsidy.[17] Individuals may be entitled to a first-home deposit subsidy equal to NZD 1 000 for each year of contribution up to a maximum of NZD 5 000 for five years. To be entitled, individuals must have contributed for at least three years to a KiwiSaver scheme at the minimum rate (4% between 1 July 2007 and 31 March 2009, 2% between 1 April 2009 and 31 March 2013, 3% since 1 April 2013), be buying their first home and be planning to live in the house for at least six months.[18] The financial incentives from the state and employers play a major part in the positive perception of KiwiSaver (Inland Revenue, 2011).

Italy is the only country where the default option for an automatically enrolled participant ensures the return of paid contributions plus a yield comparable to that of the TFR (1.5% plus 75% of the inflation rate).

Allowing people to withdraw part of their retirement saving to face contingencies can also be seen as an incentive for people to stay enrolled. However, one needs to be careful as enabling access to savings may divert too much money that was initially intended to finance retirement and affect negatively retirement income adequacy. Canada, Italy, New Zealand and the United States allow for withdrawals to face contingencies before retirement age. For individuals, a major worry about putting money into private pensions arrangements, whether mandatory or not, is that they are not able to withdraw it until retirement. Yet, there may be cases where accessing some of those funds could help solvent a major shock, such as defraying health expenses that are not covered by the health system (or private insurers). For this reason, some countries allow withdrawals from retirement savings systems under specific, exceptional circumstances. In Canada, assets accrued in PRPPs are locked-in, except in cases of disability, small amounts (less than 20% of the yearly maximum pensionable earnings), or emigration.[19] In Italy, people who switched from the TFR system to an occupational pension plan are allowed to withdraw part of their funds (and even completely in some cases, for example after four years of unemployment) every seven years for specific reasons, such as purchasing of a house or covering medical expenses. In New Zealand, people can withdraw all or part of their KiwiSaver savings if they are buying their first home (provided they have been a member of KiwiSaver for three years), emigrating (to any country except Australia), or suffering financial hardship or serious illness. Similar rules allow for so-called "hardship withdrawals" in the United States.[20]

Similarly, being allowed to stop contributing for a while can reassure savers and increase the attractiveness of private pension arrangements. However, it can also raise adequacy concerns, unless people increase their contributions to fill the gap afterwards. This option is available in New Zealand, where, after 12 months of membership, workers may take a "contribution holiday" for a minimum of three months, up to five years at a time for any reason. There is no limit on the number of times the individual can take contribution holidays. As at 30 June 2013, 127 974 members (or 6% of all KiwiSaver members) had taken a contributions holiday since the initiative began, with most having taken just one holiday (Inland Revenue, 2013).[21] In Canada, this option also exists in the sense that participants may set their contribution rate at 0% to avoid contributions into their PRPP after 12 months of membership.

Finally, it is worth noting that Canada and the United States have introduced incentives to encourage employers to automatically enrol their employees into a private pension plan. As opposed to the other countries, employers offer such plans on a voluntary basis.[22] In Canada, one important distinction between PRPP and group Registered Retirement Savings Plans (RRSPs) is that, for a PRPP, the employer contributes to the PRPP directly and gets a corresponding tax deduction, and the employer PRPP contributions are not taxable income to his employee. For a group RRSP, amounts the employer designates as contributions are taxable income to the employee. In the United States, the *Pension Protection Act* of 2006 removed disincentives to adopting automatic enrolment by facilitating the compliance of employers with the complex tax qualification requirements and providing certainty about how these plans would be treated under other aspects of the private pension and labour laws. The 2006 legislation and associated regulations provide

simplified non-discrimination tests for automatic enrolment arrangements, ensure that employers will not run afoul of state law restricting payroll withholding and wage garnishment (employers cannot be subject to lawsuits by plan participants even in states prohibiting or restricting automatic enrolment, as long as employees are given proper advance notice and 90 days to opt out of plan participation) and relieve employers of fiduciary liability for the performance of default investments in their automatic enrolment plans.

4.3.5. *Other pension plan characteristics*

Other pension plan characteristics can affect the success of automatic enrolment in raising private pension coverage. This subsection looks at the choices made by the countries covered in terms of pension plan types, plan "quality" and default arrangements.

In all the countries covered, except the United Kingdom, all workers are automatically enrolled in DC pension plans. In the United Kingdom, employers have the choice to set up and run a defined benefit (DB), hybrid (which sits between DB and DC) or DC scheme themselves or to offer their workers membership in a DC scheme run by a third-party such as an insurance company or the National Employment Savings Trust (NEST). As at March 2014, 10% of eligible workers had been automatically enrolled in a DB plan, 6% in a hybrid plan and 82% in a DC plan. The majority of employers (72%) that completed their declaration of compliance by the end of March 2014 used DC schemes to meet their automatic enrolment duties (The Pensions Regulator, 2014b).

The scale of new (or expected) pension scheme participants prompts governments to ensure that workers will be enrolled in high "quality" pension plans. For example, in order to qualify as an automatic enrolment scheme, pension plans in the United Kingdom must satisfy certain minimum requirements. The minimum requirements for DC pension plans set a minimum contribution entitlement (minimum total contribution rate of 8% of earnings and minimum employer contribution rate of 3% of earnings). The minimum requirements for DB pension plans set a benchmark for jobholder's entitlement to benefits. In addition, in order to support automatic enrolment, the British government set up NEST: a low cost, workplace, DC pension "master-trust" scheme that can be used by any employer as a qualifying automatic enrolment scheme. NEST, which went live in 2012, is open to any employer to use for automatic enrolment and is run by an independent board of trustees. At the end of June 2014, NEST had approximately 1.3 million members and over GBP 160 million assets under management (NEST, 2014).

New measures have been proposed by the U.K. government to ensure that all workplace pension schemes are of high "quality", offer value for money and are capable of delivering good outcomes (DWP, 2014c). These measures include:

- New minimum quality standards for DC workplace pension schemes;
- A charge cap on default funds of DC qualifying schemes. The cap, to come into force from April 2015, will be set at 0.75% of funds under management and will apply to all management charges, but exclude transaction costs. Consultancy charges will also be banned in qualifying schemes from this date. In 2017, the British government will examine the level of the cap and consider whether some or all transaction costs should be included within it.

- Member-borne charges incompatible with automatic enrolment will be eliminated. Adviser commissions and Active Member Discounts will be banned in qualifying schemes from April 2016.
- A change in the way transparency operates in workplace schemes. From April 2015, trustees and Independent Governance Committees will have new duties to consider and report on costs and charges.

In Canada, the PRPP framework has been set up to provide Canadians with a new, low-cost, efficiently managed, portable and accessible savings vehicle that will help them meet their retirement objectives. Because PRPP members will pool their pensions through their administrators, the PRPP will offer investment and savings opportunities at lower administration costs. The PRPP regulations state that costs to PRPP members must be at or below the costs incurred by the members of DC pension plans that provide investment options to groups of 500 or more members. The PRPP regulations define costs to mean all fees, levies and other charges that reduce a member's return on investment other than those that are triggered by the actions of the member. When a corporation applies for a licence to be a PRPP administrator, it must provide an estimate of the costs that it will charge members and a description of how it intends to meet the low cost requirement. This provides an early opportunity for the supervisor to review proposed costs against the low cost requirement. The PRPP regulations also require that costs be disclosed to members when they join a PRPP, in annual statements provided to members, and on an ongoing basis either on a website or directly to a member on request.

In New Zealand, people can choose their KiwiSaver provider. All KiwiSaver schemes are regulated by the Financial Markets Authority in a similar way to other registered pension plans. There are additional measures in place to make sure KiwiSaver schemes are competitive and members' best interests are looked after. For example, all KiwiSaver schemes are required to have fees that are not unreasonable, default providers have a special contract with the government that requires them to meet additional reporting requirements and default providers' activities and their default investment funds are closely monitored.

Default arrangements (default pension schemes and default investment options) are also central features of automatic enrolment programmes. As most individuals allocated to the default arrangement tend to stay in them, default options are likely to play an important role in determining pension income outcomes for many individuals unwilling or unable to make choices. All countries covered in this analysis offer default investment options as part of the automatic enrolment programme. In New Zealand, members can also choose their own KiwiSaver scheme, be nominated for one by their employer or be allocated to a default scheme by Inland Revenue. The proportion of those choosing their own scheme has been gradually increasing from 49% in 2008 to 67% in 2013 (Inland Revenue, 2013). In Italy, the pension fund receiving the TFR contributions is generally chosen by labour agreements. A default fund was set up with the social security agency – INPS – for workers whose labour contracts did not provide for a fund.

4.4. Effective communication and education campaigns should accompany the launch and implementation of automatic enrolment

This section looks at the importance of developing effective communication and education campaigns to accompany the launch and implementation of automatic enrolment.

Communication campaigns need to be well-targeted, clear and have a consistent message (Atkinson et al., 2012 and Chapter 5). Countries' experiences highlight the importance of having communication and awareness campaigns as well as education efforts directed to all participants of the automatic enrolment process (Paklina, 2014). Enactment of automatic enrolment legal framework and its enforcement alone is not enough to increase coverage and to lead to a behavioural change, making people save more for retirement in private pension. Communication campaigns and financial education have a role to play in increasing the understating about the changes taking place in the pension system and of specific aspects of automatic enrolment programmes, thus improving participation and compliance levels.[23]

In addition to well-targeted and clear campaigns, carefully developing a communication strategy timeline also plays an important role. Launching a communication campaign to allow sufficient time for employers and providers to understand the main changes, the implications for their activities/business and get prepared to comply with new automatic enrolment requirements is crucial.

The Superintendence of Pensions of Chile has conducted information campaigns in the context of mandatory participation of self-employed people in the pension system. The law stipulated a gradual process of introduction of the obligation, beginning with a 3-year information period (2009-2011), followed by a further period of three years (2012-2014) during which pension contributions are paid unless workers explicitly states that they do not which to pay contributions. After that period, contributing to the pension system will be mandatory. The authority has developed briefings, updated its website with information and frequently asked questions about the essential facts of automatic enrolment for self-employed workers, and developed an advertisement video played on the subway TV screens in Santiago. The authority has also organised training sessions for its staff in charge of customer service to enable them to answer queries about the automatic enrolment process for the self-employed, which can be done in person, through the website or the call centre.

In Italy, the Ministry of Labour ran a major communication campaign to inform the general public about the automatic enrolment reform. A wide range of communication channels were used: TV and radio programmes, internet (a dedicated website has been created), special events, call centre. In addition, numerous information and education initiatives were organised at the workplace by employers and trade unions involving also active participation of the contractual pension funds. Moreover, financial providers (insurance companies, etc.) have invested in marketing activities to promote their new pension products designed for automatic enrolment. The effectiveness of the communication programmes was monitored both during and at the end of the campaign.

Unfortunately, the efforts to increase awareness about the automatic enrolment scheme were insufficient given the low level of financial literacy among Italian workers (Rinaldi, 2011). The decision to launch the automatic enrolment programme a year earlier than initially planned did not allow enough time to explain major changes in the system to

the public at large. Important aspects of the implementation were defined just before or even after the start of the automatic enrolment process. With respect to the communication strategy itself, public authorities did not clearly explained the result of the past reforms that decreased public retirement benefits and did not put enough effort into communicating the advantages of joining the automatic enrolment programme that was set up. Somehow in contradiction with the spirit of automatic enrolment, the communication campaign stressed the need for individuals to take the responsibility to make a choice and decide on the appropriateness of the programme for themselves.

The impact of the communications campaign in New Zealand was more positive. Inland Revenue's campaign between May and November 2007 consisted of advertising on television, radio, on-line and in print; KiwiSaver website and information on Inland Revenue's website; guide for employers and information pack for employees; and briefings, seminars, and tradeshow presentations for employers and other professionals. The general level of awareness of KiwiSaver amongst employers and individuals was high at the end of 2007 (Inland Revenue, 2008). All of the employers surveyed (between September and October 2007) were aware of KiwiSaver and 96% of the individuals (between October 2007 and January 2008) had heard about it. Awareness amongst individuals was slightly lower, although still high, among Pacific peoples (89%), those not employed (92%) and people earning under NZD 50 000 per annum (94%). A survey conducted in 2010 (Colmar Brunton, 2010) however shows that 80% of KiwiSaver members and only 64% of non-KiwiSaver members feel they had enough information to help them decide whether or not to join KiwiSaver. This suggests that there are still ways of improving awareness and financial literacy on retirement issues, including automatic enrolment.

In the United Kingdom, two organisations are responsible for running the communications campaign: the Pensions Regulator (TPR) for employers and pension services providers, and the central government (the Department for Work and Pensions, DWP) for the general public. TPR supports employers' compliance by prompting them to achieve specific milestones during their preparations and by raising awareness and understanding of their responsibilities, through direct and indirect engagement, with them, advisers and providers. TPR's primary communications channel is its website. It contains focused areas dedicated to employers, intermediaries, pension professionals and individuals and provides access to a range of information including detailed guidance, information on selecting a pension scheme, a range of tools to support their planning needs and the declaration of compliance portal. The latest awareness tracker revealed the high levels of awareness (99%) and understanding (90%) of large and medium employers staging between August 2013 and July 2014, four months prior to their staging date, and the steadily improving levels of awareness and understanding among small employers who will not ordinarily stage until 2015-2016 (TPR, 2013).

To assist the implementation of the reforms, DWP has been running advertising campaigns to raise awareness and understanding of automatic enrolment among individuals. The campaign has run in several phases across multiple channels, including television and video on-demand, radio, press and online advertising. In addition, out-of-home advertising has been used, including outdoor advertisements at bus stops, train and tram stations, and on the sides of buses. DWP is monitoring the impact of these campaigns, including individuals' attitudes and behaviours regarding workplace pensions, via a regular tracking survey. The most recent survey carried out in October and November 2013 showed that overall campaign recognition remained high at 80% (DWP, 2014d).

Awareness was linked both to advertisement recognition and to staging dates. Advertisement recognisers were substantially more aware of the changes than non-recognisers (81% compared with 47%). Those closer to being enrolled were also typically more aware than those further away from their scheduled staging date. Campaign recognition also had an effect on stated intentions about likelihood to stay in a pension once enrolled. Nearly half of potentially eligible recognisers (47%) were more likely to say they would stay in once enrolled, compared with 34% of non-recognisers.

In the United States, the US Department of Labor's Employee Benefits Security Administration (DOL/EBSA) and the Internal Revenue Service launched a joint publication in 2009 (entitled "Automatic Enrollment 401(k) Plans for Small Businesses") to help small employers understand automatic enrolment for 401(k) plans offered to their employees. This publication provides a comprehensive overview of the advantages of starting and operating this type of 401(k) arrangement. With 401(k) plans serving as the primary source of retirement income for millions of Americans, automatic enrolment plays an important role in helping them save and invest for their retired years. This publication describes an automatic enrolment 401(k) plan, how to set up and manage the plan, and fiduciary responsibilities. It also provides a checklist to ensure compliance with the law.

4.5. Other existing incentives may lower the attractiveness of participating in private pension schemes

This section discusses two examples of incentives offered to individuals and employers interacting negatively with automatic enrolment. The first one refers to the Italian severance pay or TFR system which competes with the automatic enrolment system. The second one refers to means-tested pension benefits, which may discourage saving in private pension arrangements.

In Italy, the positive outcome on coverage of the introduction of automatic enrolment may have been larger if there would not have been competition between the existing TFR system and the private pension system. The reform introducing automatic enrolment implied for workers a choice between the two systems. Rinaldi (2011) argues that the relative failure of the reform to achieve even higher coverage rates is mainly due to the fact that the TFR system is highly valued by both employers and employees, creating an incentive to opt out of the private pension arrangement. The TFR is indeed attractive for employees because it offers an annual return guarantee of 1.5% plus 75% of the inflation rate. Moreover, employees have the possibility to partially withdraw from this fund under very specific conditions (only once, after at least eight years of employment, up to 70% of the fund). These withdrawals are allowed, for example, for the purchase of a house or to cover medical expenses. The automatic enrolment reform is neutral for large employers (50+ employees) but not for smaller ones. Indeed, since the reform of 2007, firms with 50 or more employees are obliged to transfer to the Treasury the TFR contributions that workers did not want to be paid into a pension fund. Whatever the decision of the worker (to transfer or not the TFR contributions into a pension fund), the TFR contributions are lost for the large employer. However, the TFR still provides a cheap form of financing to smaller employers. If the worker decides to opt out, the TFR contributions remain inside the firm. In addition, the measures initially announced to allow firms to get additional banking loans at low cost were not put forward. Hence small employers may have encouraged workers to opt out and stay in the TFR system.

Means-tested public pension benefits may also create disincentives to save into private pension plans. In many countries, basic, public pension benefits and in particular the social safety net is means-tested. Under means-testing, public benefits are withdrawn more or less rapidly depending on the individual's other income sources (and in some cases, his or her wealth). Incentives to save for retirement in complementary arrangements can be severely affected, at least for low and middle-income employees. In recent years, some countries have addressed this problem by reducing the so-called withdrawal rate, that is, the rate at which public pensions are reduced with growing private pension income. For instance, in Chile, the 2008 pension reform introduced a universal, basic pension benefit that lowered the withdrawal rate to about 30%. In the United Kingdom, the withdrawal rate was close to 100% until 2003, when it was lowered to about 40% with the introduction of the Pension Credit (OECD, 2011).

The ultimate effect of means-testing on savings and labour supply decision is ambiguous, as there are both substitution and income effects. However, as they generally make individuals worse off, particularly those on lower earnings, there is a strong argument to keep withdrawal rates low. Some countries have gone as far as eliminating means-testing altogether, by introducing universal, flat-rate pensions where the only eligibility conditions are age and a residency test. Examples of such universal pensions include the Netherlands and New Zealand.

4.6. Costs of automatic enrolment schemes for employers and the state

Introducing automatic enrolment may not be cost free. This section provides some elements of the costs of automatic enrolment for employers and the state, using available information from New Zealand and the United Kingdom.

The role of the employer in an automatic enrolment system is essential. Employers usually have to inform workers, choose a pension provider, categorise workers to determine whether they are eligible for automatic enrolment, enrol eligible workers, act on opt-in and opt-out requests, calculate, and pay employer contributions if any, calculate, deduct and pay employee contributions, and keep records. Therefore, on top of employer contributions, this role entails additional costs of compliance for employers.

In New Zealand, efforts have been done to minimise additional compliance costs for employers. The implementation KiwiSaver in the workplace indeed relies on the existing Employer Monthly Schedule filing process. For both small and medium enterprises (SMEs) and large employers, this has helped containing costs of compliance.

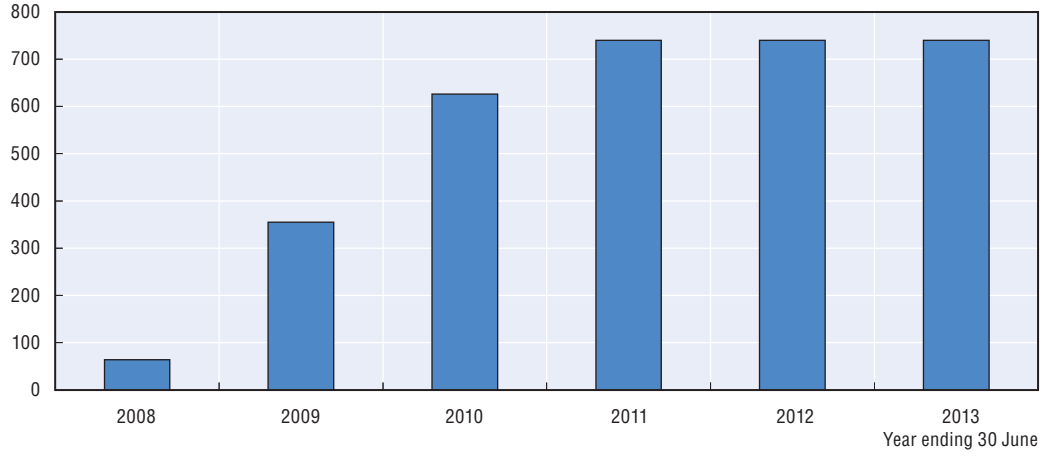
According to Inland Revenue (2010), SMEs in New Zealand spend an average of NZD 705 per SME per year meeting KiwiSaver requirements. Compliance costs are defined here as the sum of internal hours spent on tax (converted to dollar values), external costs for tax advisory services, and psychological cost (measured as a self-reported stress score on a seven-point scale). SMEs dealing with KiwiSaver spend an average of 14.5 internal hours per year (at an average cost of NZD 660 per SME) in meeting their requirements. Most SMEs do not use external tax agents for KiwiSaver so the average annual external cost is small (NZD 47). Stress levels (or psychological cost) associated with meeting KiwiSaver requirements, including finding the money for employer contributions, are relatively low (a mean score of 3.1 on a seven point scale), including when compared to the stress costs associated with meeting obligations for other tax types (e.g. income tax), which were included in the research.

The cost to large enterprises for complying with KiwiSaver legislation (including their internal and external costs associated with compliance) vary considerably between organisations. Higher levels of costs appear to be influenced by having a larger number of employees and KiwiSaver members, higher levels of staff turnover, a variety of pay periods, and having multiple collective employment agreements and non-KiwiSaver schemes. Large enterprises do not consider the ongoing administration of KiwiSaver to be stressful, with most indicating a mid-range level of stress for this.[24] Overall, KiwiSaver has not prompted employers to make changes to their remuneration practices so they have not incurred significant related costs. For the small numbers that have changed their approach to remuneration, the costs associated with putting these changes in place are relatively low.

Over the six years to June 2013, employers had contributed NZD 3.5 billion to KiwiSaver accounts. Figure 4.3 shows how these contributions split along the years. According to Inland Revenue (2013), most employers (81%) contributed the minimum 3% of the salary or wages of their employees at the end of June 2013. Seven percent of employers were contributing 4% and less than one percent contributed 8%. Five percent either did not contribute (as they may contribute to another workplace superannuation scheme), or contributed at another rate.

Figure 4.3. **Employers' contributions to KiwiSaver accounts**

In millions of NZD



Source: Inland Revenue, KiwiSaver Annual Reports.

StatLink http://dx.doi.org/10.1787/888933157269

The introduction of automatic enrolment in the United Kingdom may also have carried an extra cost for employers, who must assess eligible workers, enrol them into a qualifying pension arrangement and pay contributions on their behalf. Only around 32% of private sector employees, on average, participated in their scheme prior to automatic enrolment (Office for National Statistics, 2013). Therefore, automatic enrolment represents an extra expense if it results in more of their workforce participating. For employers who did not previously offer a scheme, the extra expense associated with automatic enrolment is increased because they have to fund the costs of setting up and administering access to a pension scheme as well as having to pay contributions on behalf of employees for the first time. Employers with existing provision may also incur expenses as a result of having

to ensure their existing scheme qualifies or if they decide to arrange alternative provision. The main challenges faced by the first employers to implement automatic enrolment have been the complexities of assessing and categorising workers, adapting payroll systems and communicating the changes to workers (DWP, 2013). DWP (2012) presents estimates of the annual cost of the reform to employers based on some modelling. The total annual cost to employers arising from automatic enrolment, based on minimum employer contributions, is estimated to be in the range of GBP 2.9 billion to GBP 4.4 billion once contributions have been fully phased in.

Implementing an automatic enrolment system also implies costs to the state. This is particularly true, in New Zealand and the United Kingdom, where the state matches employees' contributions.

Overall, up to June 2013, payments to members and employers have cost the New Zealander state NZD 5.3 billion. Figure 4.4 shows the amounts paid by the state for the member tax credit, the kick start subsidy and the employer tax credit between 2008 and 2013. The employer tax credit (up to a maximum of NZD 20 per week for each employee) was meant to reimburse employers for their contributions to employee's accounts and was cancelled in April 2009. Other incentives have been removed or reduced since the introduction of the KiwiSaver system in order to limit costs to the state. The member tax credit for example has been lowered by half from 1 July 2011 onwards. Because these payments are made annually, the first payments at the new levels occurred in the second half of 2012, causing the decrease in the costs to the state for the period July 2012 to June 2013 observed in Figure 4.4.

Figure 4.4. **KiwiSaver costs to the state**

In millions of NZD

Source: Inland Revenue, KiwiSaver Annual Report 6, 1 July 2012-30 June 2013.

StatLink http://dx.doi.org/10.1787/888933157272

DWP (2012) also modelled the annual cost for the British government of matching contributions. The annual tax relief payable on minimum worker's contributions is estimated to be in the range of GBP 1 000 million to GBP 1 700 million, in steady state once contributions have been fully phased in.

4.7. Conclusion

This chapter has described the main factors influencing the success of automatic enrolment schemes in raising private pension coverage and has assessed the costs of such schemes for employers and the state. The analysis has drawn on the experience from the six OECD countries with running automatic enrolment programmes (Canada, Chile, Italy, New Zealand, the United Kingdom and the United States).

Available evidence in these countries shows that automatic enrolment has a positive impact on coverage, but that the success of automatic enrolment in reaching high coverage rates depends on its design, including default options, the communication and education campaigns that accompany its launch and implementation, and the interaction with other existing incentives. Employers have an essential role and can incur substantial compliance costs on top of their contributions. Costs to the state mainly relate to subsidies and matching contributions.

This chapter has highlighted the following main elements for a consistent policy strategy for automatic enrolment programmes to succeed in increasing coverage of private pension plans:

- Define the target population of the automatic enrolment programme after identifying which population subgroups would need higher private pension coverage.
- Make sure the entry barriers to the automatic enrolment scheme (for example, age or earnings level) do not prevent people being able to start contributing early in the private pension system and do not exclude individuals who may benefit from a complementary private pension.
- Encourage people outside the target population of the automatic enrolment scheme to voluntarily join the scheme in order to amplify the impact on coverage. The same incentives as the ones offered to automatically enrolled members could be made available to voluntary entrants for example.
- Short irrevocable opting-out windows could help in increasing coverage rates. Alternatively, allowing people to reconsider their opt-out decision by re-enrolling them automatically at regular intervals may increase chances of extending coverage when opting-out windows are larger, but it could also implies an additional burden on employers.
- Define default contribution rates to automatic enrolment schemes in coherence with the overall pension system. They can be set below the level desired initially and raised afterwards (ideally in an automatic manner according to a set calendar) to minimise opt-out rates.
- Too low default contribution rates to the automatic enrolment scheme may lead to adequacy problems and entail a levelling down of contribution rates in previously existing DC pension plans.
- Provide financial incentives for low to middle-income households to join a private pension plan if they are part of the targeted group, by offering matching contributions and flat subsidies.
- Allowing early withdrawals and contribution holidays can minimise opt-out rates by reassuring savers in their capacity to face urgent contingencies but may lead to adequacy problems.

- Develop effective communication and education campaigns to accompany the launch and implementation of automatic enrolment. These campaigns need to deliver well-targeted, clear and consistent messages. They also need to allow sufficient time for employers and providers to understand the main changes, the implications for their activities/business and get prepared to comply with new automatic enrolment requirements.
- Assess carefully any other existing incentives to avoid negative interactions with the introduction of automatic enrolment.

Notes

1. Coverage is measured with respect to the population under 65 in the case of New Zealand as children under the age of 18 can voluntarily opt in KiwiSaver.
2. Data on self-employed individuals who contributed in 2013 are preliminary and based only on individuals who actually filled in a tax statement (Formulario 22). Those whose tax declaration is done by default are not included in these statistics.
3. See Table 1 in GAO (2009).
4. In their annual survey of member companies, the Plan Sponsor Council of America (PSCA) reported that 82% of plans used automatic enrolment only for new employees (PSCA, 2011).
5. Self-employed workers for which it is difficult to determine their income and oversee their contributions, such as agricultural and fishery workers and micro entrepreneurs, are not covered by the automatic enrolment programme. Participation in the pension system remains voluntary for them.
6. In the United Kingdom, self-employed people aged between 16 and 75 can opt in to NEST (National Employment Savings Trust), the scheme that has been set up to enable employers to meet their new workplace pension duties under automatic enrolment.
7. For Canada, the chapter only describes the features of the federal PRPP framework. Provinces can use it as a model for their respective frameworks which can differ from the federal one. For example, one year of continuous employment is needed to be automatically enrolled in Quebec for full-time and part-time employees (2 years for part-time employees in the federal framework).
8. If workers wish to leave their pension scheme after the one month opt-out period, they are permitted to do so, however they will not be able to reclaim their own contributions without paying a tax penalty (of 55%) unless they are over the age of 55.
9. The annual covered earnings to be considered for contributions by self-employed people in Chile correspond to 80% of total gross income subject to Article 42 n°2 of the *Income Tax Law*.
10. These calculations assume a contribution period of 40 years and average annual returns on investments of around 7%.
11. In the United States, employers are able to set employer and employee contribution rates providing that these rates fulfil certain requirements that apply to all DC plans. To facilitate adherence to these requirements and to make it easier and less risky for employers to include automatic enrolment in their plans, a "safe harbour" design is established for automatic enrolment plans. These rules for a Qualified Automatic Contribution Arrangement plan require that the worker's contribution be at least 3% in the first year and escalate by 1 percentage point each year to reach 6% of earnings by the fifth year. They also require that the employer's contribution be at least equivalent to 3% of each worker's earnings or that the employer matches 100% of the first 1% of earnings that the worker contributes and half of the additional worker contributions up to 6% of earnings (for a maximum match of 3.5% of earnings for each employee).
12. Phasing in of contributions does not apply to DB/certain hybrid schemes, as by law, these schemes must meet funding requirements.
13. These initial minimum employee and employer contribution rates in KiwiSaver have been changed by legislation later on.

14. Contributions are payable on an employee's qualifying earnings within a band of earnings (GBP 5 772 to GBP 41 865 in 2014/15). Qualifying earnings are made up of specific components of pay including wages, salary and bonuses.

15. Alternatively, employers can make a non-elective contribution of at least 3% of wages to all eligible non-highly compensated employees.

16. In the United Kingdom, the tax relief is paid into the account even if an individual does not pay income tax (as long as the scheme uses relief at source).

17. A number of financial incentives have been removed or reduced since the introduction of the KiwiSaver system: the employer tax credit (up to a maximum of NZD 20 per week for each employee) was meant to reimburse employers for their contributions to employee's accounts and has been removed in April 2009; the amount of the member tax credit has been lowered by half from 1 July 2011 onwards; the mortgage diversion facility (after being a member for 12 months an individual could split their contributions between their KiwiSaver account and their mortgage payments) has been removed; the fee subsidy (NZD 40 provider fee subsidy each year) has been removed; the exemption to Employer Superannuation Contribution Tax was removed from the KiwiSaver employer contribution in April 2012.

18. Income and house price caps also apply. A single person cannot earn more than NZD 80 000 a year to be eligible for a first-home deposit subsidy (NZD 120 000 for a couple). The home the member is buying has to be within the maximum house price cap for that region.

19. The yearly maximum pensionable earnings is the maximum amount of earnings used to calculate contributions and pensions under the Canada Pension Plan. Plan members who enrol individually such as self-employed people have the option of terminating their membership in their PRPP at any time. In contrast, members who are enrolled in a PRPP by their employers are unable to terminate their membership in the PRPP after the 60-day opt-out period unless they leave their job.

20. These rules allow for pre-retirement withdrawals from plans for certain purposes such as medical and educational expenses and the purchase of a first home exempting these from the 10% excise tax (although they are subject to income tax) that otherwise applies to withdrawals before retirement age. Plans in the United States are also permitted to allow members to access funds through loans from the plan, provided they are repaid on a specified minimum schedule.

21. This option also involves adding some level of administrative complexity for pension providers, as they have to keep track of whether their members are currently on a holiday.

22. In Quebec, effective July 1 2014, a new law requires employers with five or more employees and not already providing another type of qualifying pension plan to set up a voluntary retirement savings plan (VRSP) for all their employees. VRSPs are the adaptation of the PRPP framework in the province of Quebec.

23. In most countries that implemented automatic enrolment programmes, little level of knowledge of pensions was observed (Fornero and Monticone, 2011; Crossan et al., 2011; Landerretche and Martinez, 2013).

24. Large enterprises' compliance costs were investigated through in-depth case studies with a limited number of firms, so cost figures that are comparable to those for SMEs cannot be provided and the findings cannot be generalised to the whole large enterprise population.

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Chapter 5

Pension communication: Pension statements and national campaigns

This chapter looks at annual pension statements and national pension communication campaigns. It first examines pension statements themselves, setting out what they are and exploring their content, before turning to the challenge of communicating projections on pension benefits. It assesses how pension plan providers can best communicate projections of future benefits to members of defined contribution plans, looking in particular at how to convey the uncertainty underlying these projections. The second part of the chapter provides lessons learnt from examining national pension communication campaigns in various countries. Policy guidance is offered at the end of this chapter.

5.1. Introduction

Pension reform remains high on the policy agenda of many countries around the world. Ageing populations and fiscal pressures have led governments to reform their pension systems substantially, raising retirement ages and adjusting pension promises. Most of these reforms are expected to lead to a growing role for private pensions, and in particular defined contribution (DC) fully-funded arrangements, where risks are borne directly by the individual.

DC pension plans already play a key role in providing retirement income in many countries and their importance as a source of future retirement income is growing rapidly. As a result, DC pension plans will be a determining factor of old-age adequacy for future retirees. Future pensions from DC pension plans will depend on the choices members, employers, providers and regulators make about how much to contribute, how to invest, when to begin withdrawing a pension and how pension benefits should be withdrawn. All of these choices depend significantly on changes over time, and involve a number of factors that are uncertain. Therefore, in order to make these decisions, members must understand the nature of their pension plans and the risks they face.

Pension benefits from DC pension plans are inherently uncertain. Future pension benefits from these plans depend on a number of factors such as returns on investment, discount rates, inflation, wages and employment, as well as life expectancy, all of which are uncertain. The difficulty in making decisions is that the changes in these factors are unknown at the time the decisions are made.

One important tool in helping members manage this task is the pension statement they receive on regular basis, as well as projections showing their likely future pension. Pension statements provide basic accounting information such as a member's current balance and current asset allocation, along with general information about the pension plan. They can also help in conveying the uncertainty about future pension benefits from DC pension plans and provide projections about future benefits, although those projected pension benefits are never certain and members need projections they can readily comprehend. Questions regarding the returns on investments, whether the person will lose their job or how long the person will live are among the factors that generate uncertainty.

National Pension Communication Campaigns (NPCCs) also play an important role, especially in assisting pension stakeholders (e.g. employers and individuals) to understand and prepare for the changes and policies. Some countries – primarily in Latin America and Central and Eastern Europe – have carried out what are described as systemic pension reforms, which have involved a reduction in public pension benefits and a transfer of part of the social security contributions to the new DC system. Major reforms are also taking place in several Western European markets, while systems introduced earlier are under review and are being refined in the light of experience of member behaviour and in response to increasing pressures on state pension systems and concerns about the

adequacy of private provision. At the same time, in the older and more developed pensions markets, there is a marked trend among private sector employers to close defined benefit (DB) schemes for future cohorts of workers. The overall result is that in a growing number of countries the success of funded DC systems will be the determining factor in the adequacy and sustainability of old-age incomes for future retirees.

This chapter first examines the pension statement as a tool to provide information to members and assesses how pension plan providers can best use it to communicate projections of future benefits to members of DC plans, looking in particular at how to convey the uncertainty underlying these projections. It looks at the pension statements themselves, defining them and exploring the context in which they operate, and then turns to the problem of projections. This first section argues that the organisers of pension statements should set clear and measurable objectives, and the statement should provide clear and simple information about key facts. Moreover, the pension statement should be more than a passive document that delivers information, it should aim to engage members and encourage them to take active steps to improve retirement income adequacy by, for example, increasing contributions and/or postponing retirement. Whether the pension statement should provide pension projections is an open issue as policy makers need to evaluate the trade-off between simplicity and encouraging members to take active steps to improve their retirement income.

The second part of the chapter focuses on country-specific examples of NPCCs undertaken by public authorities often as part of a national strategy for financial education. It provides a view of the challenges of pension communications, examining a set of national campaigns in a range of OECD and non-OECD countries, from the pre-campaign planning and the design through to the delivery and subsequent monitoring and evaluation. It analyses and evaluates the objectives, the design, the monitoring and evaluation processes, and the communication channels used by NPCCs in selected OECD and non-OECD countries. It aims to identify examples of good practice and to draw attention to experience that, with hindsight, reveals flaws in planning and strategy. The objective is to help campaign organisers to plan campaigns carefully, to set goals that are realistic and well-targeted, and which produce outcomes that can be measured and evaluated in a meaningful way. NPPCs should ideally form part of an overall national strategy and major events such as pension reforms and crisis call for specific NPCCs. Successful NPCCs are driven by clear and measurable objectives, are evaluated and monitored against their goals and processes, avoid multiple messages and target communication for less accessible groups.

The final section summarises the main issues discussed, the main lessons learnt and provides policy guidance.

5.2. DC pension statements: Context, definitions and ways to convey uncertainty

A major global trend towards funded DC pension systems and the role of DC pension statements

The increased importance of the pension statement reflects a major global trend towards funded DC systems. The rationale for the introduction of these systems varies considerably but in many cases this is a political and socio-economic response to the challenge of ageing populations, characterised by improvements in mortality and life

expectancy.[1] As a result of these demographic trends governments make the case that they cannot afford generous and sustainable state (public) retirement incomes based on pay-as-you-go (PAYG) systems financed from taxation and social security contributions. At the same time many private sector employers argue that they cannot afford to bear the risks of defined benefit (DB) schemes for future cohorts of workers. The overall result is that for an increasing number of countries the success of the funded DC system will be the determining factor in the adequacy and sustainability of old-age incomes for future retirees.

The annual DC pension statement is the document used by governments (in the case of national centralised schemes) and by providers (in the case of private individual and employer-sponsored plans) to set out currently accrued members' benefits, as required by regulatory disclosure rules. The broad term "providers" is used in this chapter to describe the pension organisations in different markets that deliver the plans and schemes. This might include a national scheme established and run by the government, plus the schemes and plans for employees, employers and the self-employed run by private financial institutions, such as asset managers, banks, insurance companies, and pension fund entities. To a greater or lesser extent, providers also use the annual statement to improve the members' understanding of the DC plan in general and in particular to set out member rights, options and obligations. The statement is likely to be the most frequent form of written communication members receive about their private (and in some cases state/public) DC pension fund.

Pension statements reflect the national pension system, as prescribed in legislation and regulation. The OECD identifies three basic structures for national funded DC systems: voluntary, soft-compulsion (e.g., auto-enrolment of employees), and fully mandatory. Within this tripartite model there are significant variations in the accumulation and decumulation rules. Moreover, once established, these systems continue to be refined. Notable trends include the transition from voluntary to soft-compulsory systems, the increase of mandatory employee and employer contributions, a rise in the legal age at which benefits can be drawn, and restrictions in the way that benefits can be taken.

There are significant communications barriers that prevent members from making optimal use of their statements. Most providers – including the government in the case of certain national systems – assume that the average member has a low level of financial literacy and does not have access to expert advice.[2] They acknowledge that the statement should be brief, clear and simple. However, beyond the basic accounting information (the current fund value and value of contributions paid in the statement period, for example), there is little consensus as to what other information should be provided, how this should be presented, and how supervisors, regulators and providers might evaluate its effectiveness in achieving the desired objectives (e.g., encouraging members to be proactive and take positive actions to improve their pension outcome by for example increasing contributions and/or retiring later).

Unlike pension systems that provide a defined benefit at retirement, the DC outcome is uncertain.[3] Under mandatory and soft-compulsory systems, other features supervisors tend to prescribe are the minimum enrolment age, the minimum age at which benefits can be taken, and the minimum level of employer and employee contribution (but less frequently, the contributions of the self-employed). Unknown or less predictable factors include the member's future employment prospects, the investment returns net of plan

charges, the impact of inflation, and the impact of longevity trends (which affects the annuity conversion rate, for example).[4] The challenge for the pension statement is to explain these uncertain factors in a way that improves the member's level of knowledge and understanding and, where appropriate, enables members to take positive action to improve the outcome.

Most notably there is disagreement over the "forward looking" (pension projection) information, whether this should be included and, if so, how this should be calculated and presented. While in theory projections can act as a powerful call to action – to encourage members to increase contributions or to postpone retirement, for example – they are also the most complex feature of the statement and therefore the most likely aspect to give rise to member confusion. Given the length of the accumulation and decumulation periods, for young members the uncertainty surrounding projections is a particular concern.

Definition of pension information

The complexity and extent of the risks members bear under a DC system present challenges in relation to the content and design of pension statements. This section examines the types of generic information that might be provided in the statement, while the following sections provide examples of projection calculations and of focused consumer research on their reception and impact.

The information in a typical statement can be divided into two categories: basic and forward-looking (Larsson et al., 2009). The first sets out factual accounting details, while the second provides projections of future benefits.

Basic Accounting Information

Accounting information, required under regulatory disclosure guidelines, sets out the current facts about the member's DC plan. Typically this section includes:

- The name and reference number of the pension plan.
- The provider's contact details.
- The current and previous account balance.
- The current asset allocation (or name of funds).

It also sets out information about the changes in the account since the last statement date, including:

- Total contributions paid.
- Total withdrawals made (where applicable).
- Total fees deducted.
- Total investment gains or losses.

This type of basic disclosure is necessary to keep the pension system accountable and transparent. It also enables members to verify details such as pensionable salary and contribution payments received by their account. In addition the disclosure of accounting information is thought to help educate members about their pension and to increase employee appreciation of government tax benefits and the employer's contributions, where relevant.

Ideally, the accounting information provided in the annual pension statement would be comprehensive, covering the member's pension accruals from all private sources and the state pension. However, this type of combined statement is unusual. The reason given for this is the difficulty of coordinating data between different plans and providers, among other factors.

Forward-looking information

Forward-looking information in the form of pension projections can help members plan for retirement by giving them a better understanding of what to expect over the long-term. Pension projections are a potentially useful tool to help members understand what their plan might produce at retirement and the choice and risk variables that might affect the outcome, such as investment returns, inflation, maintaining or increasing contributions, future employment prospects, the date at which benefits are drawn, and life expectancy.

Pension projections can be calculated and presented on a deterministic or stochastic basis, or even as a combination of the two. Deterministic pension projections usually show the prospective benefits in a simple format, for example the potential income under a single scenario, as a point figure (cash value) and/or as a percentage of earnings. Usually there is a caveat that explains that the results are uncertain and not guaranteed. In some cases, uncertainty is conveyed through the provision of more than one scenario, so that members can see the potential impact of continuing contributions (where this is a choice), different rates of investment return associated with varying the asset mix, and different earnings patterns, for example.

While the deterministic model has the advantage of simplicity, there is a concern that it does not convey adequately the probability distribution range; nor does it measure and quantify uncertainty. However, current examples of stochastic modelling that depict a more sophisticated probability range are generally considered to be far too complicated to be of any practical use to members, although this might change in the future if suitable models can be presented in a user-friendly way.[5]

Improving projections

In theory these two forms of forward-looking information (deterministic and stochastic) can provide much more than information to members: they can help and incentivise members to make important decisions, such as whether to increase contributions or change asset allocations or fund choice. They may also encourage members to postpone the date at which benefits are drawn and to consider the form in which they take the benefits, for example they might be encouraged to appreciate the advantages of buying a lifetime annuity as opposed to taking a lump sum, where this choice is offered.[6] However, in practice, there are various difficulties in providing appropriate information that can be relied on for such decisions.

Developments in the provision of pensions projections

Projections, by definition, do not offer any certainty and one of the goals of the pension statement could therefore be to communicate uncertainty in a way that enables the member to take appropriate action. Nevertheless, if members are expected to plan ahead, they need at least an approximate idea of what their plan might deliver in terms of a retirement income expressed as a monetary value in "today's prices" (that is, taking

account of inflation). These parameters – the provider's need to explain the scope of the uncertainty and the member's need for a reasonable approximation of income expressed in simple language – frame the current debate over projections.

Deterministic projections can be informative but they will likely prove inaccurate and therefore they are accompanied by a caveat that states that figures are estimates and are not guaranteed. This deterministic projection (with the accompanying caveat) is thought to have the advantage of clarity and simplicity.

The provision of different deterministic scenarios might be used effectively to illustrate the impact of different rates of returns on investment (high, medium and low) but it is unclear how the member might respond to these risk variables if they do not understand investment risk in the first place. The same point is true of variables based on life expectancy, which the member will not be in a position to predict, with the possible exception of those who suffer from a life-shortening health condition. Of more practical use, therefore, are the scenarios that invite member engagement, such as projections that show the impact of an increase in contributions and the deferment of the date at which benefits are drawn. In some cases members in secure employment might also be able to make use of projections that take account of future salary growth.

Stochastic projections of future pension benefits depict probability distributions and therefore provide a wider range of possible outcomes and probabilities. In theory this model enables uncertainty to be quantified and priced but inevitably these projections are more complex to prepare, difficult to illustrate, and can be very difficult (if not impossible) for members to interpret in a way that prompts active engagement. The question, therefore, is whether there is a way to design and deliver more sophisticated projections that are also consumer-friendly. This question is only recently being addressed, and currently is not contained within printed versions of pension statements.

The Chilean Pension Regulator (SP: Superintendencia de Pensiones) has developed a pension risk simulator. They tested different approaches to convey the personalised information reported by the simulator using focus groups. In conjunction with a web programmer, they developed a web tool that implements the findings of this exercise (Antolin and Fuentes, 2012). The Swedish pension authority is also considering the introduction of stochastic modelling within an online tool. There is some concern within these authorities that such information might obscure the other important messages in the printed version of the statement.

Defining and communicating the underlying assumptions

The rules governing the assumptions providers can make in their pension projections in relation to the statement and to website calculators vary from country to country. In most cases the regulator or supervisor sets the assumption or range of assumptions but in some countries there are no specific rules as yet (Slovak Republic) or projections are not permitted due to concerns about the potential for member misunderstanding (Pakistan). Assumptions used in statements are more limited than those that can be used for website calculators, where the member has the facility to change one or more features in the calculation.

Where supervisors or regulators set the assumptions, the rules might require providers to use a single figure for the investment return (as in the Netherlands) or they might be prescriptive across all choice and risk variables (as in Mexico). Particularly noteworthy is the variation in the maximum investment return assumption shown in

Table 5.1, which ranges from 3.74% in Israel (for all asset classes) to growth fund assumptions of 7% in the United Kingdom (9% can be used for the illustration provided at joining) and 8% in Australia and Colombia. Best practice indicates that the interest rates or return assumptions implicit in projections should be in line with current market trends and historical experience.

Table 5.1. **Examples of projection assumptions for statements and calculators**

Country	Range and Assumptions
Australia	Projections range from 5% (cash) to 8% (growth), with an inflation assumption of 2.5% + 1% rise in living standards. The projected income is based on a payment period to age 90
Austria	Parameters reflect Pensionkasse annual investment income, technical surplus and assumed interest rate, among other factors.
Bulgaria	Projections are based on fees, the interest rate, the year of retirement, and the number of years during which the member will be receiving pension.
Chile	Projections are member-specific in relation to age, gender and accumulated balance, and are based on the fund's future expected yield, the level of future contributions, and the age of retirement, among other factors. For members with a minimum of 10 years to go to the legal retirement age, the calculation assumes a real annual return of 5% under two contribution scenarios.
Colombia	Projection assumptions range from 4% (conservative) to 8% (higher risk).
Costa Rica	Projections are based on gender and assumptions about the contribution density.
Denmark	Projections (web calculator) are based on the member's choice of assumptions.
Estonia	The calculator on the supervisor's website is generic and allows the user to input the expected rates of return, contributions, and investment period, based on a pre-set range.
Hong Kong	Projections are based on assumptions about monthly income, investment periods and investment returns, among other factors. The MPFA is reviewing the scope for improving the current methodology.
Israel*	Projections are based on the accumulated current value, the expected retirement age, the interest rate (currently 3.74%) and the assumption that 60% of the pension on the member's death will be paid to the widow.
Macedonia	Projections are based on the contribution level, the contribution period, the return, and the fees.
Mexico	The model assumes an annual compounding process, a real annual net return of 5% and that contributions are made at mid-year. The calculation projects the accumulated balance in the individual's account at retirement (age 65) and is based on the member's salary, current age and the current balance in the pension fund.
Netherlands	Funds are required to use an interest rate of 4%. They are free to choose their own mortality table.
Pakistan	Due to the recent nature of pension reform, at present the Securities and Exchange Commission does not allow pension fund managers to provide growth assumptions or projections, as it is feared that inaccurate projections would adversely affect the confidence of investors.
Poland	A web-based pension calculator is available on an affiliated financial education website *www.manymany.info*. This enables members to estimate future pension and replacement rates from private pension funds and the social security pension, based on different assumption about wages, the rate of return and the labour market.
Slovak Republic	There are no specific rules on the calculation method.
Sweden	Projections assume two wage growth scenarios: 0% and 2%. The rate of return on the funded individual account is assumed to be 3.5% higher than earnings growth.
United Kingdom	Projections are based on a maximum assumed growth rate (7% on annual statements, 9% on illustrations on joining). The rate should be reasonable in relation to the underlying assets, for example a lower rate should be used for cash than for equities. The scheme's charges should be taken into account, with an allowance for anticipated increases.

* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Table 5.1 shows the wide variety in the bases for projection assumptions in a range of countries, particularly in relation to the investment return (also described as the interest rate). Several countries specify that the return assumption must take account of inflation. Bulgaria, Macedonia and the United Kingdom, for example, state that projections must make an allowance for both inflation and charges.

In Australia details about underlying assumptions are included in an online calculator.[7] The investment assumptions reflect the investment strategy of the member's

fund: 5% (cash), 6.5% (conservative), 7.5% (balanced), and 8% (growth). Inflation assumptions include 2.5% for cost of living and 1% for the rise in living standards. The projected income is based on a payment period to age 90. A similar system is used in Colombia, where the technical interest rate (investment assumption) varies according to the fund risk-rating: 4% (conservative), 6% (moderate risk) and 8% (higher risk).

The Danish Insurance Association uses a range of assumptions for the pension projection tool on its website, which produces deterministic projections based on the member's choice of assumptions. The perceived advantage of this tool is that it is easy to use and the results are shown with the aid of simple graphics. The projections are made using one set of default assumptions. The user can vary the assumptions by selecting from pre-set ranges.[8]

In Chile, the Personalized Pension Projection (PPP) sent to members from age 30 is member-specific in relation to age, gender and the accumulated balance. The PPP is based on the fund's future expected yield, the level of future contributions, the age of retirement, and the age of the pensioner's dependents at the date of retirement. For members with a minimum of 10 years to go to the legal retirement age, the calculation assumes a real annual return of 5% under two contribution scenarios: one in which contributions are paid every month until the legal retirement age, and one in which contributions cease at the date the projection is made. This is designed to help members understand the importance of maintaining contributions and of the necessary actions they might take (paying voluntary contributions, for example), if they consider that the projected pension will be inadequate. The Chilean pension regulator (SP) requires pension funds to show in their pension statement projections of how benefits vary with retirement age. For older members the projection includes an estimate of benefits at the legal retirement age and of benefits where the member postpones retirement for three years beyond this date.

The SP, with the support of the OECD, launched a project in 2011 to assess how to better communicate the results of complex stochastic pension models. The project involved focus groups to assess the most appropriate language to use when communicating pension issues to people of different socio-economic backgrounds. A pension risk simulator that uses stochastic modelling to determine future pension benefits with attached probabilities given the parameters of the system, and usability tests of the web tool were also developed.[9] The SP is now testing an electronic pension statement to which members have access in national employment offices, and where they can assess the impact on their retirement income of saving more and/or retiring later. The results are based on the Chilean Pension Risk Simulator, a stochastic model projecting future pension benefits depending on the parameters of the system.

In Mexico there is a single growth projection, which is a net annual return of 5%. The calculation projects the accumulated balance in the individual's account at retirement (age 65) and is based on the member's salary, current age and the current balance in the pension fund. There is a separate calculator to estimate the final balance of self-employed workers, which bases projections on the level and frequency of voluntary contributions, earnings, current age, and the current balance in the fund (Afore).

Sweden requires projections to be net of inflation. In addition, projections assume two wage growth scenarios: 0% and 2%. The rate of return on the funded individual account is assumed to be 3.5% higher than earnings growth. By providing different scenarios, the aim is to indicate that benefits will vary with economic growth. Moreover, the "Orange

Envelope" (annual statement for the public pension – both PAYG and funded PPM component) presents projections that show how benefits vary with retirement age. Pension benefits for participants under age 60 are shown at the earliest age they can be withdrawn (age 61), at age 65, and at age 70. The purpose is to show that working longer will result in higher benefits. Benefits are automatically adjusted for average life expectancy, so the system demonstrates that younger cohorts have to work longer to receive the same replacement rates as older cohorts. The Swedish Pension Agency has considered using cohort-specific retirement ages in the projections in the Orange Envelope. In 2004 the supervisor launched the official Swedish on-line pension calculator.[10] This presents individual projections of the public pension and occupational pension benefits and the total projected pension. It is interesting to note, however, that Sweden operates a very different approach for the SAF-LO pension plan, which is the occupational DC arrangement that covers most blue-collar workers in the private sector and which currently has approximately 1.6 million active employees. No pension projections are provided on the pension statement for the SAF-LO, as they are considered to be unreliable and could give members a false sense of security.

The discussion here has stressed the importance of pension statements in providing tailored and specific information to members in order to encourage them to be pro-active and take actions to improve their retirement income. However, when far-reaching reforms of pension systems are involved, policy makers need other instruments to communicate their impact to the population as a whole, as discussed in the following section.

5.3. National pension communication campaigns (NPCC)

This section assesses mass communication campaigns that may be necessary to provide general information to members and non-members alike. It also considers the lessons that have been learned by authorities creating national pensions communication campaigns and provides recommendations for the future.

The OECD "Recommendation on Good Practices for Financial Education Relating to Private Pensions",[11] launched in 2008, states that pension communication campaigns should be developed to "explain public policy clearly (particularly where mandatory savings are involved), including pension reform, the pension environment, increased individual responsibility, and demographic changes that require individuals to save more. This will help to maintain confidence and transparency in the pension system and thereby encourage individual saving for retirement". This recommendation also recognises the fact that financial literacy levels remain generally low, undermining the ability of individuals to manage their DC accounts.[12, 13] As a result, policymakers face a major public policy challenge to ensure that people are adequately informed about changes in the pension system, the impact of those changes on their pension benefits, and the options they face to improve their financial well-being in retirement. Communication campaigns therefore should ideally be part of an overall national strategy for financial education as recommended in the OECD/INFE High-level Principles on National Strategy for Financial Education endorsed by G20 leaders in 2012 (OECD, 2012c). Such strategies are aimed more specifically at raising financial literacy levels among the general population, including school programmes designed to provide future cohorts of workers with the knowledge and skills to prepare for their own retirement.

Effective, broad-based communication campaigns – described as National Pension Communication Campaigns (NPCCs) in this chapter – are critical to ensure the success of pension reforms, especially those involving the introduction of DC systems. NPCCs can have a wide range of purposes, including building political and social consensus for the reform, increasing trust and confidence in the new pension system, and helping individuals understand changes in the pension system and their implications, enabling them to take appropriate actions. NPCCs can also be used on an ongoing basis, for example, to raise awareness about the need to save for retirement, to encourage active consumer engagement with their pensions and also to respond to market conditions that might undermine the individual's confidence in DC systems, such as the recent financial crisis. Such campaigns have been a dominant feature of the major systemic pension reforms that began in the late twentieth-century and are regarded as essential by organisers of the reforms taking place today.

NPCCs are usually designed and delivered by a government department or agency, often in collaboration with key stakeholders, such as regulators, private providers, and employers and unions. The design of the NPCC depends on its goals and target audience. The objectives of each NPCC reflect the relevant stage of reform reached, for example advance announcement, phased implementation and post-implementation changes. NPCCs can be largely informative (e.g. setting out the individual's rights, responsibilities and choices), they may seek to change individual views (e.g. support a pension reform) or they may be aimed at changing individual behaviour and engagement (e.g. to increase contributions to pension plans).

There are three main challenges for any communication initiative in the area of pensions: the lack of interest in the topic for a large part of the population (especially the young), the perceived or actual complexity of the topic, and the low level of financial awareness, knowledge, motivations, confidence, skills and responsibility of consumers, especially among the more vulnerable groups.

Beyond NPCCs, good communication and effective information disclosure to plan members is essential in DC plans.[14] In general, the individual bears increased risk in these plans and is required to make a variety of complex financial decisions (how much to save, in which funds, which retirement income product to choose, etc.). Governments are increasingly recognising that NPCCs, disclosure rules and other consumer protection policies therefore need to be supported by a financial literacy campaign that educates the public about all applicable sources of retirement income and other essential financial matters, such as debt, savings and insurance. Important trends in recent years, reflected in the NPCCs examined in this section, include the closer coordination between NPCCs and national strategies for financial education including financial literacy initiatives for the adult population as a whole, as well as financial education courses in schools and those targeted at specific groups, such as women or the self-employed.

Campaign design

Communication campaigns may be stand-alone, or ideally form part of a broader national financial education strategy designed explicitly to improve levels of financial literacy. This will depend on their objectives, which in turn will shape their characteristics and implementation, as indicated below.

Campaign goals and objectives

The most important aspect of any NPCC is its goals. These are set by the government, the pension supervisor or other public agency, possibly in consultation with other stakeholders, and may include one or more of the following aims:

- Building ***consensus*** among the general public about the need for reform;
- Raising ***public awareness*** about changes in pension systems, the choices faced by individuals and the potential implications for retirement income security;
- Strengthening ***public trust*** and confidence in the institutions in charge of pension reform and retirement income provision;
- Improving individuals' ***understanding and knowledge*** about a pension reform or the operation of a pension system to facilitate their decision-making over both one-off decisions (such as whether to stay in the old pension system or move to the new one) and recurrent ones (such as the choice of pension provider and investments);
- Influencing ***individual behaviour***, such as encouraging workers to move from the old to a new pension system, to remain in an auto-enrolled pension plan, to establish a regular savings habit, to increase contributions, or to delay the retirement age.

These NPCC objectives may refer to campaigns associated with a specific pension reform and those that have more general, on-going objectives. In some cases the NPCC that introduces specific reform might also be used to present a holistic picture of the sources of pension, including the state (public) system, the new funded system and the voluntary system. A campaign undertaken in Israel is an example of this type of comprehensive campaign. Campaigns might also combine two objectives. New Zealand's NPCC, for example, formed part of a wider national strategy for financial education aimed to raise levels of financial literacy in general, as well as pensions knowledge.

i) NPPCs linked to systemic pension reforms. Systemic pension reforms are defined as those that involve the introduction of a mandatory or auto-enrolment funded DC system, usually at the same time that public pension benefits are reduced. In many of these reforms, part of the social security contributions that were previously financing the public PAYG pension systems are transferred to the new funded DC system. The NPCC objectives will reflect the nature of the reform, the period in which it is introduced, and the specific stage of reform to be communicated. Campaigns linked to systemic reforms have certain characteristics in common, including the following features.

In some cases, such as the introduction of the mandatory funded DC Superannuation system in Australia, employees did not have a choice: they had to join. In others, the reform involved a reduction in public benefit rights and a transfer of contributions to a new DC system. These types of reforms are by nature controversial and hence a major goal of the communication campaign is to build consensus for the reform, raise awareness and establish trust in the new system.

Under most systemic reforms, individuals also face a combination of new responsibilities and choices. For example, under the reforms in countries such as Chile, Estonia, Mexico, Poland, and the Slovak Republic, workers below a certain age had to decide whether to stay in the old system (PAYG) or move to the new system with a funded DC component. In Poland in the 1990s, employees up to age 30 had to join the new system, while for the 30-50-year olds membership was optional and it was possible to remain in the

old system. The third age group – those over age 50 – had to remain in the old system. In this case the campaign aimed to explain the benefits of the new system to younger people but also to reassure older members that the original system would remain secure. A campaign to accompany a systemic pension reform of this kind is also being implemented in Armenia from 2011-15. In the recent campaign in Singapore, members were encouraged to join the new lifetime annuity system voluntarily before it became compulsory in 2013.

These fundamental choices may be presented in different ways, depending on the government's objectives. For example the choices might be presented in a way that encourages as many people as possible to transfer to the new reformed system on a voluntary basis before it becomes fully mandatory. An important aspect of such reforms, which is reflected in the communication, is the design of the default mechanism. In some cases, the default position might leave the member in the old pension system, while in others the default position might transfer the member to the new system. The communication campaign, therefore, complements the default rule and often has an implicit – if not explicit – goal of influencing individual decisions.

Campaigns have also been used to introduce national auto-enrolment retirement savings systems, like the New Zealand KiwiSaver. Under this type of reform, typically the employer is required to auto-enrol employees in the scheme. For the employee the default position is to stay in: to opt out requires an active decision. A similar employee default position was used in the United Kingdom and Italian auto-enrolment arrangements. In these reforms, the governments' expectation is that lack of individual engagement over pension issues will lead many employees to stay in the system on a passive basis. Hence, in the accompanying campaigns, the organisers may try to influence behaviour to discourage opting-out and may support this objective through an overarching focus on building trust in the new system.

ii) NPCCs with one-off or on-going objectives. Beyond systemic pension reforms, the main type of NPCC used tends to be of an on-going nature. However, one-off, short-lived campaigns have been used by governments to seek public support or at least reduce opposition to parametric reforms to the public pension system, such as an increase in the retirement age or a change in the way benefits are calculated. One-off campaigns were also used during the recent financial crisis. Examples of such campaigns include those developed by Israel and Mexico. These campaigns aimed at promoting trust in the pension system, as well as reassuring members about their long-term investment objective and reinforcing the message about the importance of maintaining regular contributions.

Campaigns with on-going objectives include those that aim at promoting personal savings habits or encouraging employers and trade unions to set up and broaden access to pension plans under voluntary systems. For instance, communication campaigns have been used to raise awareness and promote labour market coverage of voluntary private pension systems in countries such as Denmark, Indonesia, Ireland, Spain, and the United States.

Voluntary systems present different communication challenges compared with mandatory and soft-compulsory systems. To achieve the desired levels of voluntary participation the campaign aims to change attitudes and perceptions and the results are wholly dependent on consumers making active choices to join a plan individually or through the employer. The campaign in Denmark demonstrates that this type of campaign

needs to explain the voluntary nature of the decision to join but also to stress that this action is a prudent step and one that the government fully endorses.

Other campaigns with ongoing objectives may be aimed at improving knowledge and understanding of pension products as part of broader financial education initiatives. For example, in the United States the voluntary pension system is supported by a federal government programme of national pension education, which is coordinated with a financial literacy programme. A similar approach is taken in the Spanish financial education programme which also covers the promotion of the voluntary pension system.

Other characteristics of campaigns

Pension systems covered: The campaign may communicate details about the pension system as a whole (for example in relation to an increase in retirement ages) or a specific part, such as the state (public) system or a new funded DC system. The main models of DC pension systems covered by the campaigns examined in this section are mandatory, auto-enrolment and / or voluntary (many mandatory and auto-enrolment systems also have a voluntary section to enable members to top up their pensions).

Target audience: An important feature of more recent campaigns is the targeting of specific audiences. The decision to organise a focused campaign might reflect the fact that the pension reform only affects an easily identifiable section of the population, or it might be the case that the organisers have made a conscious decision to divide the target population into specific categories in order to ensure communication is appropriate. Such an approach also facilitates monitoring and evaluation, as is discussed in the next subsection.

Depending on the stage of reform, the campaign might also focus on particular groups, such as young people about to enter the workforce, older employees approaching retirement, and the more vulnerable sections of the labour market, for example lower earners, women (who in most countries have lower levels of pension provision than men), immigrants, ethnic minorities and indigenous peoples. Employers also form an important target for certain NPCCs, where the reform introduces the opportunity or requirement for workplace pension schemes.

Campaign organiser: Typically this will be the appropriate government department, its agency, and/or the pension supervisor. In some cases the organiser is the national bank.

Key stakeholders: In a funded DC system, supervisors work closely with regulators and, where applicable, the national scheme. Such systems usually rely on private providers to administer plans, to provide the investment funds, and to provide draw-down products, such as annuities. Therefore, private providers, or their industry representatives, also represent key stakeholders, which can help disseminate information and help raise awareness and levels of knowledge. In addition, the NPCC organiser is likely to work closely with employers, trade unions, consumer representatives, and academics, among others.

One of the issues such collaboration raises and which needs to be addressed at the outset of the campaign is the potential confusion, on the part of consumers, between the government NPCC and the advertising, marketing and sales activities of private providers. This confusion can also make the evaluation of monitored results more complicated.

NPCCs that accompany systemic reforms are usually led by the government or a delegated agency. Given the controversy regarding these reforms, their complexity, breadth, and the different stages involved in the communication campaign, it is important

to maintain an effective control of the campaign, avoid mixed messages and ensure the objectivity of the information provided. In Estonia, for example, private providers agreed to postpone their advertising until the government's NPCC was completed. In Poland, the government went as far as restricting the marketing campaigns used by pension providers during its own NPCC.

Compared with campaigns linked to systemic pension reforms, those with on-going objectives tend to rely more directly and explicitly on the funding and activities of the private pension providers. In Denmark's case the new system was funded by the entire pensions industry, which also runs the central website and targets individuals. Ireland coordinated its campaign with trade unions and employer groups, the National Library Network, women's groups, and industry associations, among other relevant organisations and outlets.

Campaign time frame: The campaign might take place over a specific period or it might be on-going. In the latter case the organiser might increase communications at specific times, such as in response to a financial crisis, when it might be felt necessary to reassure members of a funded DC system that over the longer-term their pension fund is likely to make up for any temporary investment losses.

NPCCs that accompany a systemic pension reform are usually time-bound. They are most often used during the period of consensus-building prior to the approval and implementation of the reform and during the first years of a new system to build trust and awareness. Where individuals have a choice, frequently there is a specific period during which the option is available, for example the decision to join a new system voluntarily (which might be encouraged by a bonus, as in the case of Singapore) or to opt out of an auto-enrolment system (a recurring option for those who initially opt out and also for those changing employment). In this case the communication campaign efforts are concentrated on this decision-making period.

Campaigns are frequently divided into stages, according to the objectives, the date the reform is implemented, and when the new system begins to pay benefits, among others. For example, in the case of Estonia and Sweden, the purpose of the initial NPCC was to raise awareness of the reform in advance of its implementation and to build trust in the new system. Closer to the implementation date, a follow-up NPCC was used to remind those affected by the reform about their new responsibilities and to explain their choices, for example in relation to the provider and the investment choice, where relevant.

A third stage of the campaign may be used to coincide with the date the system begins to pay benefits, so that members approaching retirement understand their options. Such a campaign is already planned in Estonia, while in Singapore a targeted campaign is being used to communicate changes to the annuity system.

Unlike systemic pension reforms, where typically individual choice applies to a predetermined period of time or to specific actions (the choice of fund and/or provider, for example), the promotion of voluntary pensions requires an on-going programme of communications to encourage new workers to join and to encourage those in the system to increase contributions. In practice, few campaigns are indefinite. An example is the Pension Fund Socialization and Education Campaign, launched in Indonesia in 2008, which is an on-going campaign that aims to educate and encourage employers and unions to establish a pension scheme on a voluntary basis, and to encourage employees to join. The objective of the campaign is to increase participation rates by 5% per annum. The main

channel used in ongoing communication campaigns are websites, as they can be maintained at relatively low cost.

Ireland used a rolling programme of NPCCs over five years to introduce and promote its voluntary system of individual accounts. The campaign organiser coordinated the programme with trade unions and employer groups, the National Library Network, women's groups, and industry associations, among other relevant organisations and outlets. The overarching objectives were to increase awareness and coverage, to encourage voluntary savings, to ensure that provision is adequate, and to give the general public a solid educational foundation for retirement planning for the future.

An example of a relatively short-lived campaign was the German NPCC in 2001 which involved media advertising to support the introduction of Riester pensions, a voluntary pension plan that benefits from substantial government subsidies. A later campaign in Germany in 2007 aimed to inform the general public about the rise in the official retirement age.

Budget: The source of funding for the campaign varies. In most cases this is a government / public authority but there might also be an element of external funding, for example under a voluntary DC system where private providers contribute or fund the entire campaign, on the basis that they will benefit from the increased business.

Distribution channels: The range is extensive and changing rapidly. The following examples are neither exhaustive nor mutually exclusive:

- *Traditional media:* An essential resource, this includes a diverse range of channels, for example television, radio, newspapers / journals (independent articles, placed articles and advertorials), and press releases.
- *The Internet:* The supervisor may devote a section of its own website or have a dedicated website to communicate information about the pensions system. In some cases this will be the result of collaboration between the supervisor and private providers. The site communicates information and might also encourage member engagement through the provision of a pension calculator, among other features. Information may also be disseminated through banner advertisements, pop-ups, video-clips and other web-based applications placed on other websites, and through social media such as Twitter and Facebook, for example.
- *Printed material:* This includes leaflets, guides, and wall posters, for example, which may be disseminated in a range of ways, including as billboard advertising, on public transport or in public places: Libraries and citizens' advice bureaux, among others.
- *Mobile phones:* A more recent addition and considered useful during holiday periods and also to reach younger people.
- *Education establishments:* University/school events and courses run within a curriculum are a growing trend. These may be provided within a national financial literacy strategy.

Outreach: Although usually included in "distribution channels", this can be regarded as a related but different category because it involves direct engagement, often face-to-face, with the target audience. Examples include workplace events, public seminars, workshops and road shows.

Practical examples of implementation

The actual implementation of NPCCs varies depending on its specific objectives, the type of campaign that has been designed and other aspects such as the role of different stakeholders. This section reviews and analyses country-specific examples from the NPCCs surveyed by the OECD, focusing primarily on problems that emerged during the organisation and implementation of the campaigns and the solutions proposed by the more successful cases. The analysis is based mainly on responses to an OECD/INFE questionnaire by the country respondents from the government or other public bodies.

Insufficient resources restricted the scope of some campaigns

Campaign budgets from central sources vary considerably and in some cases were judged by the organisers to be insufficient to achieve the NPCC's objectives. Examples of this problem include Indonesia, which lacked human resource capacity among other factors; Mexico, where the campaign suffered due to lack of regional representation; and the United States, where lack of resources made it difficult to reach diverse and underserved sections of the population.

Confusion between government information and provider marketing in some campaigns

The involvement of private providers can be very beneficial to achieve the communication goal of NPCCs. For example, in Croatia, pension funds and pension insurance companies helped to disseminate information about the new system and also organised seminars, conferences, workshops and press events. However, there have also been some unfortunate experiences (e.g., Hungary and Poland).

The early DC experience of Hungary and Poland demonstrates that providers' advertising and marketing campaigns can overshadow the government's information NPCC and, in certain cases, give rise to a situation where consumers over-estimate the benefits and under-estimate the cost and risks of the DC system. The NPCC organiser in Hungary reported that the government campaign was subsumed by the high level of advertising conducted by private pension operators, whose marketing costs led to complaints that the new system was too expensive. In Poland, the organiser realised that an important aspect of the NPCC was to help people interpret the high level of advertising on the part of providers keen to develop their share of the new market. It stressed the need for the government to maintain strict controls over the marketing campaigns of private operators, which in this case appear to have painted too rosy a picture of the new pension system.

To avoid potential conflict, Estonia took the decision to avoid giving fund-specific details on performance during the NPCC phase. It secured the support of private providers, which agreed to postpone their brand advertising until the NPCC was completed. More recently, in 2010, Italy established a programme of coordinated activity between the government and private providers to promote financial education and pension initiatives for its new quasi-compulsory system. This included the creation of a common website devoted to financial and retirement education. The results of this state-private collaboration will be of interest.

Some campaigns were organised in different stages to avoid multiple messages

The research indicated that the more focused the NPCC, the more likely it is to achieve its goals. For example, the Estonia NPCC, which introduced systemic reform, was divided into two clear stages. The first explained the need for reform and why the new system was selected; the second explained the individual's responsibilities and options in relation to different age groups and provided information on how to join.

In Poland, the NPCC used to introduce systemic reform was complicated by the fact that it aimed to communicate different messages to three distinct age groups. The new system was compulsory for those under age 30; people aged 30-50 had to decide whether to join the new system or remain in the old one, while the over-50s were not affected by the reform and had no option but to remain in the old system. Notably, the NPCC proved to be more successful than anticipated, or desired, in promoting the benefits of the new system to the 30-50-year olds. The expectation was that 25-45% of this age range would make the switch to the new system, whereas 60% actually did so. This gave rise to the concern that some employees unwittingly gave up early retirement rights under the old scheme that are unlikely to be matched by the new DC system.

The problem identified by the Polish NPCC is that it is very difficult to describe simultaneously the merits of both the new and old systems. This suggests that organisers should divide NPCCs into clearer stages and use separate communications where messages for different groups are potentially confusing or contradictory.

The Singapore NPCC was the most focused communications exercise in the survey and reflects the fact that the change to be communicated was a refinement to a well-established system rather than a systemic reform. The NPCC explained the transition from programmed withdrawals to a lifetime annuity. The target group was members born between 1949 and 1954. The aim was to encourage voluntary switching before the new arrangement becomes mandatory in 2013. A second phase of the campaign was launched in 2012 focusing on the new cohorts for whom annuities are mandatory.

Some campaigns developed innovative communications channels

In addition to the common use of a dedicated website and advertising on television, radio, and in the press, several organisers demonstrated an innovative approach in relation to specific target audiences. A good example of this is the NPCC in Ireland, which used cinema to reach young people, whom the organiser regarded as "light" TV viewers. Ireland's NPCC also made extensive use of radio because the population has the highest level of radio audience in Europe. In addition it used "ambient" advertising, included posters on buses and in washrooms and this aspect of the campaign ran in tandem with internet banners, as a way to target young consumers in the course of their daily routines.

Most campaigns sought to harness the power of the press

In some countries, the campaigns used the press as a key vehicle to channel messages to the general public. For example, Ireland used the press as an information medium through the supply of articles about increasing the awareness of the importance of starting a pension. Singapore placed advertorials in newspapers that were written by in-house journalists. New Zealand monitors press coverage of KiwiSaver to assess positive and negative impact, although it is not clear how this research is used.

Organisers should be aware, however, that the press is likely to look for bad news as well as good news stories. With hindsight the organisers of the first NPCC in Hungary realised that it did not clearly explain the reform and the member's choices. The media was highly critical and therefore served to undermine rather than support the new system.

Outreach programmes were used effectively in some campaigns

Outreach communications exercises are distinguished from passive channels, such as poster, radio and television, because they engage directly with the public and facilitate a two-way dialogue. The recent Singapore NPCC included 90 outreach events (road shows, public talks, and "meet the people" sessions) staffed by representatives trained to answer member queries. The Estonia NPCC included a call centre, investment fairs, and road shows. The 2007-8 NPCC in Hungary launched an internet debate about the reform (using civic platforms), which aims to ensure communications exercises in order to avoid misunderstandings. In Mexico the NPCC organiser's agents visited employers, universities, trade unions, and associations; while at "fairs" the pension authorities, Afores (providers) and other pension-related institutions gave information to employees on the pension system.

In Indonesia, where the DC system is voluntary, the NPCC includes seminars and workshops, which are evaluated to assess participants' perceptions and are also followed through by monitoring the number of participants that joined a pension plan after the seminar. The NPCC has been deemed highly effective in raising awareness about pensions, but its scope and budget has been rather limited.

Limits of stand-alone and short-term NPCCs to tackle low levels of financial literacy

The complexity of pension NPCCs, particularly in relation to funded DC systems, reveals serious shortcomings in national financial literacy levels. This was the most consistent message that emerged from the research and case studies. Pension communication campaigns, especially, temporary ones, were felt to be insufficient to bring about lasting improvements in financial literacy. Some countries therefore, integrated their NPCC into a broader national strategy for financial education including school initiatives (OECD, 2012c, OECD, 2013; OECD, 2014).

In Mexico, the organiser's agents give presentations on the pension system to students. Poland has a separate NPCC that is linked to financial education, where the pension component (for 2010-12) focuses on upper-secondary schools and targets students about to enter the workforce. Through teacher resources and training it explains the pension system and the individual's obligations in terms of contributions, and also the DC investment choices. Ireland also targets schools through a resource pack for economics and business studies teachers, while in Germany pension specialists offer an independent training course through about 500 adult education centres.

The merits of school-based programmes appear to be extensive. Apart from informing future generations of workers about the pension system, the organiser of the programme in Poland pointed out that where different members of a household are targeted this can have an overall beneficial effect, as it stimulates family discussion. The idea that children's questions can prompt adult interest is interesting from a behavioural finance perspective.

Communication response to financial crises

Certain problems beyond the government's control, such as a global financial crisis, will adversely affect members of funded DC systems and the impact can be very sudden, taking members by surprise. In response to the financial crisis that began in 2008, Ireland, Israel and Mexico were among the countries that increased their communications to reassure DC members about the long-term nature of their investments.[15] Mexico, for example, printed crisis-related pamphlets, which it distributed to the 100 000 members that contacted the pension regulator seeking advice. In New Zealand, the NPCC organiser reported that the financial crisis has had a positive impact because reluctant employers of the auto-enrolment system recognised the value of providing information about finance and pensions in the workplace.

5.4. Conclusion and lessons learnt

This chapter has addressed the importance of pension statements and the challenges of communicating projections of future pension benefits to members of DC pensions plans. It has also explored the rich and varied experiences of NPCC organisers around the world, as they strive to understand how best to disseminate the implications for individuals and employers of major pension policy decisions. The result is a series of lessons that explain the practical issues associated with communicating complex and emotive information and messages to a population that typically is characterised by a low level of financial literacy.

Pension statements

The pension statement should ideally combine all pension information relevant to the individual, incorporating information from all pension sources (PAYG-financed pensions as well as private and funded pensions) given the overall structure of the pension system.

Statement organisers should set clear and measurable objectives and introduce thorough evaluation processes. In the absence of robust evaluation, pension statements are unlikely to perform an optimal role in the communication of key information; they will not encourage members to take appropriate actions; nor will they support broader national DC communication programmes, for example in relation to pension reform and national financial literacy campaigns.

The statement should be much more than a passive document that delivers information. Rather, it should aim to engage the member and encourage actions to check, and if necessary improve retirement income adequacy. In particular it should focus on demonstrating the potential impact of increased contributions and the postponement of retirement.

For a maximum impact, the statement should present a clear and simple summary of key facts on the first page. Information provided for the purpose of regulatory "accountability" and "transparency" does not readily translate into member empowerment. Supervisors and regulators should therefore consider whether the statutory information that pension providers are required to disclose could be sent in a separate document from the main annual statement.

Much more work needs to be done on the best way to present projections that are meaningful and that also prompt members to take appropriate action:

- Projected *fund values* at retirement should be included but the most important figure for the consumer is likely to be the projected *monthly income*, which should be highlighted.

However, this depends on the instrument used to allocate the amount of assets accumulated at retirement (e.g., annuities, drawdown programs, etc.).

- Assumptions should be net of actual charges and take account of future inflation, so that the member sees the projected monthly income in "today's prices".
- Overall, the debate about projections should focus more clearly on behavioural issues and the language that consumers use and understand. In particular, consumers are unlikely to understand the mathematical concept of probability and might confuse this with "blind chance" or a lottery system. Even the term "projection" might be misunderstood and a suitable user-friendly synonym should be adopted, such as "forecast" or "indication". Mathematical and technical accuracy should give way to user-friendly language.
- More sophisticated online projection tools might enable some members to make appropriate and meaningful connections between the management of the accumulation and decumulation stages of the DC plan – that is, between assets and liabilities. However, it is unlikely that this type of tool would be suitable for the majority, so it should be restricted to the website and offered as a click-through from the main deterministic projection calculator page.
- Some of the concerns about the uncertainty associated with deterministic projections might be addressed through the use of more cautious investment and inflation assumptions and the use of actual plan charges in projections. Further research might indicate that one of the greatest risks to members' potential retirement funds are due to the use in statements of unrealistic assumptions and also to the imposition of excessive plan charges, the impact of which is not made evident in the providers' projections.

Pension supervisors and regulators should collaborate at an international level to achieve greater consistency in the prescribed assumptions to be used by private providers. At present it is not clear that the wide range of investment assumptions used across different countries can be attributed solely to the local rules on permitted DC plan assets and access to capital markets.

Where providers have a significant degree of discretion in their choice of assumptions, this can lead to inconsistencies and member confusion. This point applies to web calculators as well as pension statements. The required use of a single government calculator might be appropriate, with some discretion for providers to make adaptations where these are demonstrated to be beneficial to members.

The written statement, as the sole means of communicating benefits, is inflexible and limited. It remains essential, however, because many people do not have easy access to, or are familiar with, the internet. Nevertheless, it is likely that a simplified paper statement could be supported by a message sent to mobile phones, for example, and through the provision of further information on the relevant website. Overall, the internet offers a more flexible delivery format that avoids information overload, as it allows the member to access information in accordance with their needs and to develop awareness and understanding through the use of the web calculator, which is an active pension-planning tool.

The value of pension information to the individual is significantly diminished if information only relates to a single plan. Therefore there is an urgent need for combined pension statements that take account of the all sources of pensions, including state (public) systems. Moreover the inclusion of all private plans would also draw attention to "forgotten" accounts from previous employment, for example, and would prompt

individuals to consolidate plans where appropriate. Supervisors and providers should work together to achieve this essential longer-term objective.

National Pension Communication Campaigns

The main policy guidelines or lessons that emerge from the analysis of the NPCCs carried out in previous sections, covering all aspects of NPCCs, from design to implementation and evaluation, are:

NPCCs should ideally form part of an overall national strategy for financial education aimed at improving the financial awareness and literacy of the overall population. The complexity of pension NPCCs, particularly in relation to funded DC systems, reveals serious shortcomings in national financial literacy levels. Pension communication campaigns, especially, temporary ones, are generally insufficient to bring about lasting improvements in financial literacy. It is therefore desirable to integrate NPCCs into a broader on-going programme of financial education beginning at schools (OECD, 2005; 2012).

Major events, such as pension reforms and crisis, call for specific national pension communication campaigns. While communication campaigns should in general accompany pension systems, major pension reforms, especially those that involve the introduction of mandatory DC pension plans require the support of effective and efficient NPCCs. Financial crises also call for swift public communication action by governments and regulators. NPCC organisers need to act swiftly to allay concerns associated with a global crisis and be in a position to demonstrate that the government has taken effective action, where relevant.

Clear and measurable objectives should drive successful campaigns. The most important aspect of any NPCC is its goals. Clear and measurable goals drive successful planning, implementation and evaluation processes. Such goals may include the following: to build consensus for the reform; to raise public awareness about changes in pension systems; to explain the individual's choices and the potential implications these choices have for their financial well-being in retirement; to strengthen public trust and confidence in the institutions in charge of retirement income provision, especially at times of pension reform and during financial crises; to facilitate the employer and individual's active and informed decisions; and to encourage specific behaviour, such as voluntarily joining a new system, increasing contributions or postponing retirement.

There is a need for robust evaluation processes. Evaluation should form an essential element of the campaign budget, even where resources are limited. The incorporation of evaluation in campaign planning will enable the organisers to analyse the effectiveness (impact) of the campaign and its efficiency (cost-benefit analysis, value for money) in order to ensure appropriate allocation of future resources. It will also enable organisers to test their objectives at an early planning stage to ensure that these are practical and can be measured in a meaningful way. The evaluation process should include pre-campaign research and regular monitoring and evaluation of the campaign via both quantitative and qualitative tools.

Phased NPCCs should be used to avoid multiple messages. The more focused the NPCC, the more likely it is to achieve its goals. Messages need to be short and simple, and complex reform details should be broken down into appropriate and thematic component parts, which can then be delivered in a series of communication phases. For example, in the case of a systemic reform, the first phase might be to announce the reform and its

benefits in order to achieve public consensus, while the second phase – closer to the date of implementation – might explain the individual and employer's responsibilities and choices under the new rules.

NPCCs need to target communications for less accessible groups. In order to be efficient and effective, communication campaigns need to be targeted to specific groups. For instance, campaigns seeking to raise the coverage of voluntary pension systems may pay particular attention to young, unskilled and rural workers, groups often regarded as under-pensioned. A different approach uses behavioural categories, whereby the population is divided according to perceived levels of awareness, interest and willingness to engage and take action. Targeted communication is also critical where different messages apply to different sections of the population, for example when following a systemic pension reform, the new system is mandatory for one age group, voluntary for a second, and not applicable to older workers.

Government NPPC campaigns should avoid confusion with private providers' campaigns. Working in partnership with private providers is considered important where these providers will deliver the products and services. Moreover, the involvement of private providers can be very beneficial to achieve the communication goal of NPCCs. NPCC organisers should also evaluate the potential of free communications channels, for example including the NPCC banner and web-link on providers' websites, taking into account any risk that the government's independent messages might be compromised, as might occur where the "free" channel is interpreted by the public as an endorsement of a provider's products. In the case of systemic pension reforms, it is preferable to delay providers' sales campaigns while the government's NPCC is in progress.

NPCCs should consider harnessing the power of the press. In many countries individuals value the press as an independent source of personal financial information and advice. While advertising in the national and regional press is a standard feature of NPCCs, more can be done to use this channel to reinforce the government's message. It is highly desirable to cultivate a positive relationship with the press from the outset, bearing in mind the fact that the press is likely to look for bad news as well as good news stories.

NPCC should consider the use of innovative communication channels. In addition to the common use of a dedicated website and advertising on television, radio, and in the press, campaign organisers should consider innovative approaches in relation to specific target audiences. For instance, the younger section of the population may be best approached via social media, while mobile phones can be an effective and relatively low-cost way to reach a large number of individuals.

Designers of NPCCs should develop outreach programmes in partnership with a range of relevant and trustworthy stakeholders to increase engagement. In more recent campaigns, organisers have focused resources on outreach programmes, such as "meet the people" sessions, road shows, seminars, and adult education workshops. Feedback generally is very positive, as outreach engages the public in ways that passive communications and advertising does not.

NPCCs could make use of the budget for the most effective and cost-efficient channels. A formal analysis of the relative impact of different channels in relation to their cost will ensure that a limited budget is spent wisely and in a way that is accountable, thus enhancing transparency. If the budget is not sufficient to meet all desired communications objectives, then it is essential to consider the priorities at the outset. Ideally it will be

possible to combine cost-effective channels that will reach the entire population and selected channels that are better suited for targeted communities.

Notes

1. The sharp increase of birth rates in the 1950s and 1960s, followed by the return of birth rates to previous levels, created the "baby boom" generation. The retirement of this generation represents a significant social and economic challenge for all pension systems but in particular for PAYG-financed systems, as there is an imbalance between the cohorts joining the labour market and the baby boom cohorts entering retirement. However, while the baby boom impact is temporary, the impact of improvements in mortality and life expectancy (longevity) appears to be a permanent feature (wars and pandemics excepting), which creates problems for PAYG-funded and funded pension systems alike. Additionally, low fertility rates may also lead in the future to smaller cohorts entering the labour market than those exiting the labour market.
2. OECD (2008): Improving Financial Education and Awareness on Insurance and Private Pensions; Lusardi, A. and O. Mitchell (2007), "Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education," *Business Economics*, Jan. 2007. See *www.financial-education.org* for OECD work on this subject.
3. Antolin and Payet (2011) provides a discussion of how labour market, financial market and demographic risk may affect the retirement income from DC pension plans. It provides a range of possible retirement income outcomes with their probabilities.
4. In some countries, including Belgium, Denmark, Germany and Switzerland, DC plans offer a minimum rate of return, although the rate can change in response to market conditions.
5. Antolin and Fuentes (2012), and references therein, provide a description of the Chilean Pension Risk Simulator, which uses stochastic modelling.
6. Chapter 6 of the OECD Pensions Outlook (2012) stresses the importance of contributing and contributing for long periods, as well as the beneficial impact of postponing retirement to increase the adequacy of retirement income.
7. *www.fido.gov.au*
8. See *www.forsikringogpension.dk/Pension/Dit_behov/pensionsmaaler/Sider/Pensionsmaaler.aspx*
9. See Antolin and Fuentes (2012) for a detailed explanation of the project, the results and the experience in developing a pension risk simulator and communicating complex stochastic pension benefit projections.
10. *www.minpension.se*
11. Recommendation on Good Practices for Financial Education Relating to Private Pensions: *www.oecd.org/daf/pensions*
12. In 2003, the OECD launched an international programme on financial education, under the aegis of the OECD Committee on Financial Markets and the OECD Insurance and Private Pensions Committee. One of the first milestones of the programme was the adoption of the "Recommendation on Principles and Good Practices for Financial Education and Awareness" by the OECD Council (OECD, 2005), available at *www.oecd.org*. The OECD defines financial education as the process by which financial consumers/investors improve their understanding of financial products and concepts; and through information, instruction and/or objective advice develop the skills and confidence to become more aware of financial risks and opportunities to make informed choices, to know where to go for help, and take other effective actions to improve their financial well-being and protection.
13. For an OECD review of the evidence on pensions literacy, see OECD (2008), "Improving Financial Education and Awareness of Insurance and Private Pensions".
14. The role of the supervisor in providing comparative DC information to plan members is described in IOPS (2011a, b).
15. For a full list of countries that used financial crisis campaigns see IOPS (2011a,b).

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(21 2014 01 1 P) ISBN 978-92-64-22090-4 – 2014

OECD Pensions Outlook 2014

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Consult this publication on line at ***http://dx.doi.org/10.1787/9789264222687-en.***

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ISBN 978-92-64-22090-4
21 2014 01 1 P