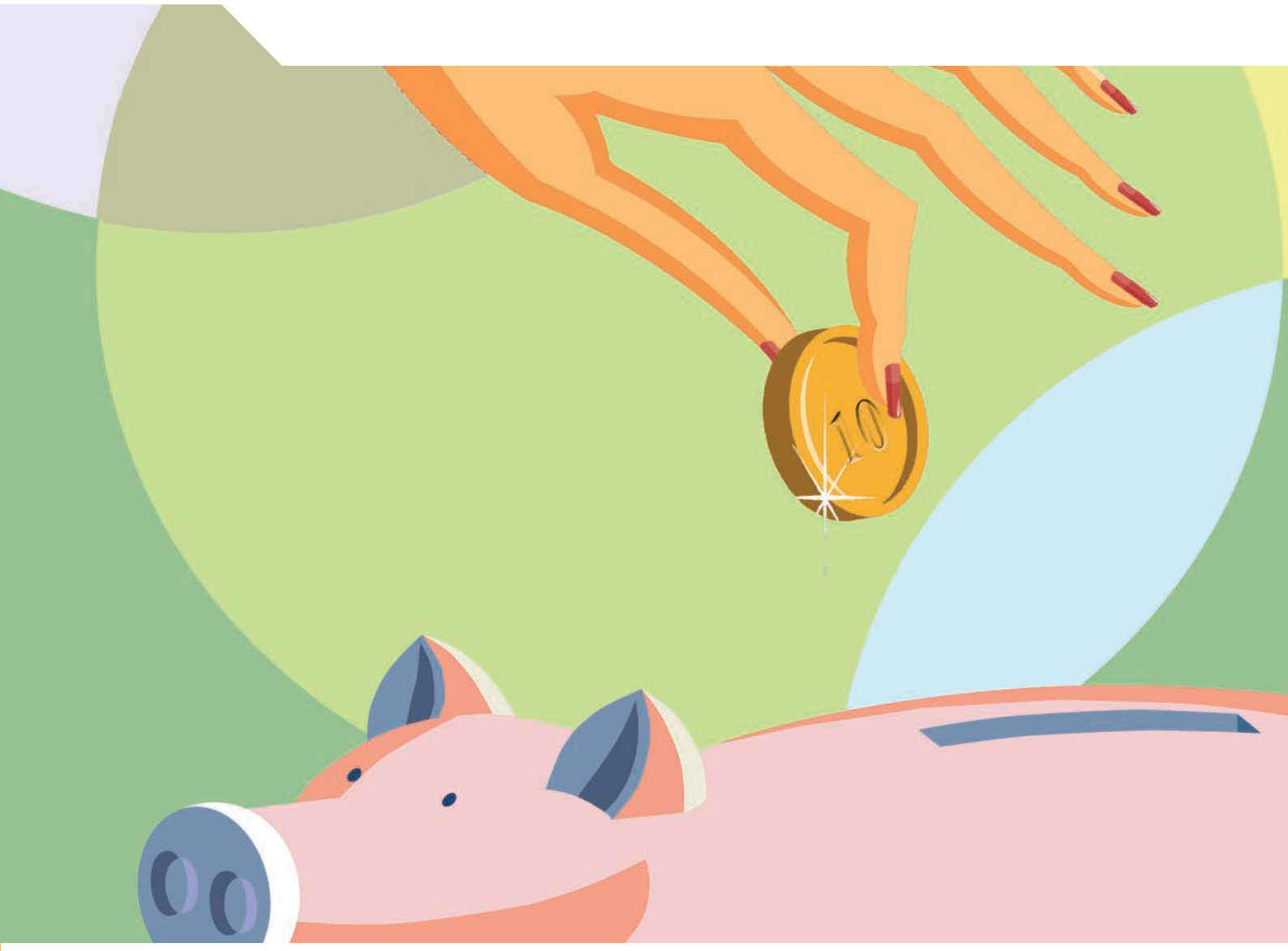
Pensions at a Glance 2017

OECD AND G20 INDICATORS



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BETTER POLICIES FOR BETTER LIVES

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Foreword

This seventh edition of Pensions at a Glance *provides a range of indicators for comparing pension policies and their outcomes between OECD countries. The indicators are also, where possible, provided for the other major economies that are members of the G20. Two special chapters (Chapters 1 to 2) provide a deeper analysis of recent pension reforms and flexible retirement opportunities within OECD countries.*

This report was prepared, under the general supervision of Gabriela Ramos, OECD Chief of Staff and Sherpa to the G20, by the pensions team in the Social Policy Division of the OECD Directorate for Employment, Labour and Social Affairs: Boele Bonthuis, Hervé Boulhol, Maciej Lis and Andrew Reilly. National officials – particularly delegates to the OECD Working Party on Social Policy and members of the OECD pension expert group – provided invaluable input to the report. For OECD countries, the results of the OECD pension models have been confirmed and validated by national authorities.

Chapter 1 on "Recent pension reforms" was written by Boele Bonthuis. Chapter 2 entitled "Flexible retirement in OECD countries" was written by Boele Bonthuis and Andrew Reilly. The indicators in Chapters 3 to 7 were computed by Andrew Reilly. The indicators related to private pensions were provided by Romain Despalins and Stéphanie Payet from the OECD's private-pensions unit in the Directorate for Financial and Enterprise Affairs. Hervé Boulhol led the team and was responsible for revising and enhancing these chapters. Chapter 2 was edited by Alexander Pick. Marlène Mohier prepared the manuscript for publication.

The report benefited from extensive comments by Monika Queisser, Head of the Social Policy Division, especially in Chapter 2. We are grateful to many national officials and colleagues in the OECD Secretariat, notably Pablo Antolin, Manuel Flores, Christian Geppert, Maciej Lis, Marius Lüske, Tomoko Onoda, Stéphanie Payet, Mark Pearson, Stefano Scarpetta and Anne Sonnet, for their useful comments. It is a joint project co-financed by the European Commission and the OECD.

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Editorial
Flexibility or the comeback of early retirement?

Few reforms are as contested as raising the retirement age. It is a key marker of when a society finds it normal to stop working and acceptable to draw a pension; it also signals when workers can expect to retire; and it is a threshold for many employers that indicates when their workers are expected to leave their company.

Population ageing and financial sustainability concerns have created pressures on policy makers to raise the retirement age, even if most people do not like this. Employment opportunities for older workers are increasing and people are living longer and healthier lives and thus could spend more years in retirement. Nevertheless, there is still strong resistance to higher pension ages in many countries.

Why is it so unpopular to work longer even among people with longer life expectancy and in good health? Is the proposition of retirement and leisure so much more attractive than work, even if working longer is rewarded with higher pensions? Does it perhaps make no economic sense to work longer? Or are people being pushed out of work by their employers who do not see the benefits of keeping older workers on board?

The answer is likely a mix of all of these factors. Older workers are a diverse group; people have different preferences on how and when to move from work to retirement. Some are able and motivated to work for longer, perhaps for the income, or the social interactions that work brings, or simply because they like their job. Others want to stop working earlier because of health issues, to pursue other interests or, as is increasingly the case, to care for elderly relatives or grandchildren.

It is thus not surprising that calls for more *flexible* retirement rules are re-surfacing in the public debate, often with a different connotation than in the past. Now many people are asking for some form of combining pensions and work, for example drawing a partial pension and continuing to work on a reduced schedule. A recent survey, for example, suggests that almost two-thirds of EU citizens say it appeals more to them to combine a part-time job and partial pension than to fully retire. Often, people want to work beyond what is considered the "normal" pension age. But flexibility can also mean retiring earlier, with reduced pension benefits supplemented by earnings from work.

From a government perspective, flexible retirement is a two-edged sword. On the one hand, it can increase people's well-being by allowing them to combine work and a partial pension if they wish and it may entice some people to work longer. This, in turn, can help increase workers' future pensions. Working longer will also contribute to greater economic growth and higher tax revenues, especially in countries faced with rapid population ageing. On the other hand, introducing flexible retirement carries risks, as individuals may underestimate their financial needs in retirement and thus choose to leave early with reduced benefits and find themselves later at risk of old-age poverty. And there are equity

considerations as well: early retirement might not be a feasible option for those with lower pensions, unlike the better-off, who may be able to retire early and spread their pension over a longer period.

As the analysis in this edition of *Pensions at a Glance* shows, there are many factors that enter the retirement decision: the set-up of pension systems, how much is paid at which age, and whether it pays off to work longer. Our findings suggest, however, that in many OECD countries, pension rules are such that flexible retirement is possible and not discouraged.

So why has individual uptake of flexible retirement been so low? The answer is that there are other barriers outside the pension system that limit people's autonomy in deciding when to retire. Age discrimination among employers is still widespread, due to prejudice about older workers' productivity and ability to adapt to new challenges or to age-related wage mechanisms that increase the costs of keeping older workers. Part-time work at older ages is still rare and often mandatory retirement rules enable employers to terminate contracts at a certain age.

To give workers true choice over their future in work and retirement, pension policy measures should be complemented with wider labour market policies. People need clear and honest information on the benefits they can expect to receive under each scenario to make informed choices. Early retirement can carry risks and these need to be fully understood. Employers should be encouraged to provide more flexible work solutions to workers wishing to prolong their career at older ages. In the context of population ageing and looming labour shortages in some countries this need is urgent. Only under such conditions can pension policy respond to demands for flexibility without jeopardising people's economic security in old age.

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Executive summary

This edition of *Pensions at a Glance* reviews and analyses the pension measures enacted or legislated in OECD countries between September 2015 and September 2017 and provides an in-depth review of flexible retirement policies. As in past editions, a comprehensive selection of pension policy indicators is included for all OECD and G20 countries.

Pension reforms have been fewer and less widespread than in previous years

Since 2015, the pace of pension reforms in OECD countries has slowed and reforms have been less widespread. Improving public finances have eased the pressure to reform pension systems. However, some countries have changed retirement ages, benefits, contributions or tax incentives. Canada, the Czech Republic, Finland, Greece and Poland took far-reaching measures, with some of them reversing previous reforms.

Over the last two years, the statutory retirement age was changed in six countries. About one-third of OECD countries changed contributions and another third modified benefit levels for all or some retirees. Based on legislation, the normal retirement age will increase in about half of OECD countries, with links to life expectancy in Denmark, Finland, Italy, the Netherlands, Portugal and the Slovak Republic. On average, the normal retirement age will increase by 1.5 years for men and 2.1 years for women, reaching just under 66 years around 2060. This means that, on average, the retirement period will increase relative to people's working lives.

Three countries have future retirement ages over 68 years: Denmark, Italy and the Netherlands. By contrast, the normal retirement age will remain below 65 only in France, Greece, Luxembourg, Slovenia and Turkey for full-career workers. Moreover, only Israel, Poland and Switzerland will maintain a gender gap in the retirement age.

Concerns about the financial sustainability of pension systems and retirement income adequacy remain, given the projected acceleration of population ageing, higher inequality during the working age and the changing nature of work. Past reforms addressing financial sustainability will lower pension benefits in many countries.

The net replacement rate from mandatory pension schemes for full-career average-wage earners entering the labour market today is equal to 63%, on average in OECD countries, ranging from 29% in the United Kingdom to 102% in Turkey. Replacement rates for low-income earners are 10 points higher, on average, ranging from under 40% in Mexico and Poland, to more than 100% in Denmark, Israel and the Netherlands.

In non-OECD G20 countries, South Africa has a very low projected net replacement rate, of 17% for average earners from the mandatory component. By contrast, future net replacement rates are higher than 80% in Argentina, China and India. Of these countries

only Indonesia implemented a major reform over the last two years by introducing a mandatory defined benefit pension scheme.

Flexible retirement: what it means, why it matters

Flexible retirement is the ability to draw a pension – full or partial – while continuing in paid work, often with reduced working hours, or to choose when to retire. Longer lives, the increasing diversity of work trajectories and the growing desire for more autonomy in the retirement decision are motivating calls for rules that allow individuals to decide when and how to retire.

Many workers want greater retirement flexibility. However, take-up rates are relatively small. In Europe, about 10% of individuals aged 60-64 or 65-69 combine work and pensions. And about 50% of workers older than 65 work part-time on average in OECD countries; this share has been stable over the past 15 years.

Steps to improve flexible retirement opportunities

Most OECD pension systems allow combining work and pensions after the normal retirement age, albeit with some disincentives. In Australia, Denmark, Greece, Israel, Japan, Korea and Spain earnings limits apply, beyond which pension benefits are reduced. In France, working pensioners fully withdrawing their pension do not earn any additional pension entitlements despite paying contributions.

The situation is more complex before the normal retirement age. Flexibility to retire fully before the normal retirement age is strongly restricted in more than half of OECD countries. In another fifteen countries, retiring a few years early is allowed and pension benefits are reduced in line what is justified by actuarial principles.

While eleven countries allow combining work and early pension within some limits, few have early partial retirement. Whether pensioners would benefit from enhanced partial retirement opportunities depends on their capacity to make well-informed choices to avoid jeopardising their final retirement incomes. Financial literacy plays an important role in that respect.

Barriers to flexible retirement also exist outside the pension system, especially in the labour market or in cultural acceptance of part-time work, limiting the freedom in retirement decision.

Postponing retirement will lead to higher pension entitlements in the vast majority of countries. In Estonia, Iceland, Japan, Korea, and especially Portugal, the financial incentives to continue working after the retirement age are large and go beyond the increases that would be justified to compensate for the shorter retirement period.

Chile, the Czech Republic, Estonia, Italy, Mexico, Norway, Portugal, the Slovak Republic and Sweden offer flexible retirement for the baseline OECD case. These countries allow: combining work and pensions flexibly after the retirement age, in particular without any earnings limitations; reward postponing retirement; and, do not heavily penalise retiring early. In Italy and the Slovak Republic, however, people entering the labour market today will only be offered flexibility at ages higher than 67 and 66 years, respectively.

Real choice in making the retirement decision means that postponing retirement should be sufficiently rewarding to compensate for lost pension years; on the other hand, retiring a few years before the normal retirement age should not be overly penalised.

However, flexibility should be conditional on ensuring the financial balance of the pension system, which implies that pension benefits should be actuarially adjusted in line with the flexible age of retirement. Moreover, some people might underestimate their future needs and retire too early with insufficient future pensions. Policies that de facto restrict early flexible retirement might therefore be needed; the early retirement age should be set high enough to make sure that individuals accumulate sufficient pension entitlements.

Chapter 1

Recent pension reforms

This chapter looks at pension reforms in OECD countries over the past two years (between September 2015 and September 2017). Most OECD countries have enacted pension reforms since the last publication of Pension at a Glance. *However, the reforms have been fewer and less widespread than in previous years with one-fifth of OECD countries taking no policy action. Among the most common reforms are changes in benefits and contributions. In addition, retirement ages are being adjusted in the majority of OECD countries. However, some of these adjustments are a reversal of previously legislated retirement age increases.*

1.1. Introduction

In the last few years the pace of pension reforms across the OECD countries has slowed. After the financial crisis and the subsequent sovereign debt crisis in Europe, pension reforms were plenty and widespread, as documented in previous editions of *Pensions at a Glance*.[1] However, even taking into account the progress that has been made, concerns about the financial sustainability and pension adequacy of the current state of pension systems in OECD countries remain.

Continued ageing of societies combined with the changing nature of work puts pressure on both the financial sustainability and the retirement income adequacy of pension systems; in addition, risks of increasing old-age inequality have been building up (OECD, 2017). At the same time, the momentum for far reaching pension reforms might be dwindling. After a decade of stress, improved government finances, potential pension reform fatigue as well as politically volatile times and rising populism are slowing the pace of reform.

Public expenditure on pensions as a percentage of GDP has increased and is expected to rise further in the near future in most OECD countries. For the OECD as a whole, public pension expenditure rose by about 2.5% of GDP since 1990. Currently, Greece and Italy already spend more than 15% of GDP on pensions. However, long-term prospects have improved and the projected pace of spending growth has slowed substantially (see indicators 7.3 and 7.5 in this publication; Fall and Bloch, 2014; European Commission, 2015).[2] At the same time, recent reforms will lower replacement rates in many countries due to measures aimed at improving pension finances. This may jeopardise the adequacy of retirement income in some countries, especially for retiring low-skilled and low-paid workers. The long term need to reform is still present in many countries, especially given the ongoing improvements in longevity.

The challenges for financial sustainability and pension adequacy generally call for bold action by policy makers. To keep defined benefit systems financially sustainable a number of measures can be taken. Contributions can be raised, initial benefits can be cut and indexation of pensions in payment can be limited. These measures have been taken in many countries. In many European countries, for example, replacement rates are projected to decline while the financial balance of pension systems is projected to improve in coming decades (European Commission, 2015). Higher contributions might improve financial sustainability and/or pension adequacy but it raises non-wage costs, which in turn may affect net wages and employment depending on how the labour market adjusts over time. In countries where pension contribution rates are low, lower net wages might be acceptable to workers if this preserves or raises retirement income levels in the future.[3] By contrast, cutting benefits and limiting indexation endangers pension adequacy, in particular in countries which are already facing low pension income prospects. Against this background, raising the retirement age can be a win-win proposition: it increases the labour force participation of older workers and helps maintain pension levels, at least for those who can actually work longer.

To maintain retirement income adequacy a number of measures can be taken. Apart from raising contributions resulting in higher entitlements, coverage of mandatory schemes can be increased. In most OECD countries, however, there are limits to this strategy since coverage levels among the employed population are already very high. Only countries with a relatively large informal economy can significantly increase pension coverage, but this will require policy packages which extend far beyond pension policies. However, coverage can also be extended to groups that are not systematically covered, such as the self-employed. Moreover, coverage of voluntary private pensions can still be improved in many countries. Adequacy concerns can also be addressed by raising the level of basic and minimum pensions, possibly in combination with relaxing eligibility criteria for such pensions, albeit at a cost and potential risks for financial sustainability.

The changing nature of work in the context of population ageing highlights the importance of continuing to improve pension systems. Most pension systems are still based on the idea that people enter the labour market after finishing school, find a stable full-time job, often staying with the same employer, and retire from that company around age 65. Increasingly, such career patterns appear to be less realistic and may no longer correspond to people's preferences. Careers are patchier, people switch jobs, different types of contracts are used and different hours are worked. Moreover, technological progress is profoundly transforming the labour market, making some tasks and jobs obsolete and requiring workers to adapt their skills to a rapidly changing environment. For some, labour market positions will be squeesed and jobs will be made redundant. For others, advancing technology combined with greater flexibility will enable work conditions that can be better adapted to people's profiles and preferences. In the absence of increased redistribution, widening inequality on the labour market will eventually result in widening income inequality in old age. Policies to limit inequality in old-age, going much beyond pension policies, are discussed in the recently released OECD report *Preventing Ageing Unequally* (OECD, 2017).

In order to implement the needed reforms popular and political support is needed. Cutting benefits, increasing contributions or raising the retirement age, however, are unpopular. Given the significant political clout of older age groups, pension reforms that limit benefits paid over longer periods might be difficult to pass. Economic, financial and budgetary crises are often seen as logical points in time to implement reforms. Indeed, as shown in previous editions of *Pensions at a Glance*, many pension reforms were passed in times of crisis. However, reforming in a hurry can backfire, and from a macroeconomic perspective this has undesirable side-effects as it tends to amplify economic cycles adding pain in already difficult times. As result, pension reforms may be reversed, which has been occurring in some OECD countries recently. It is therefore important for governments to carefully build support, communicate clearly and take enough time to construct a viable reform plan.

The rest of the chapter is structured as follows. Section 1.2 sets the scene by describing some key indicators, Section 1.3 details the most recent pension reforms and, finally, Section 1.4 concludes.

Key findings

- Most OECD countries have enacted pension reforms since the last publication of *Pension at a Glance* (OECD, 2015). However, the reforms have been fewer and less widespread than in previous years.

- Reforms will potentially have a large impact on the pension system in Canada, the Czech Republic, Finland, Greece and Poland.
- The retirement age was changed in six countries. Three of them actually reduced the long-term planned retirement age, including the Czech Republic, and Poland where this change will directly lead to substantially lower replacement rates.
- Based on legislated measures, the normal retirement age will increase by 1.5 and 2.1 years on average for men and women, respectively, in the OECD, reaching just under 66 years over the next four to five decades.
- The future normal retirement age varies enormously from 59 years in Turkey (women only) and 60 years in Luxembourg and Slovenia to an estimated 74 years in Denmark.
- The net replacement rate from mandatory pension schemes for full-career average-wage earners is equal to 63%, on average in OECD countries, ranging from 29% in the United Kingdom to 102% in Turkey. Low-income (half the average wage) earners generally have higher net replacement rates than average-income earners, by 10 points, on average across the OECD.
- In non-OECD G20 countries, net replacement rates for full-career average-wage earners range from 17% in South Africa to 99% in India. Only Indonesia implemented a major reform over the last two years by introducing a mandatory defined benefit pension scheme.
- Many countries have introduced automatic links between pension benefits and life expectancy. Funded defined contribution schemes have automatic links through more expensive annuities with increasing longevity, but links also exist in notional defined contribution systems, in point systems (Germany) and in defined benefit schemes (e.g. in Finland and Japan).

Most pension reforms over the past two year were undertaken in the following areas:

- Twelve countries modified contribution rates or limits contributions, by age or income (e.g. Australia, Canada, Hungary and Latvia).
- Twelve OECD countries changed benefit levels for all or specific groups of retirees (e.g. Canada, Finland, France and Greece). This either involved an outright adjustment of rules used to compute benefits, benefit cuts for higher earners, changes of the guaranteed minimum rate of return, of the reference salary, of the pension point value or of wider options for annuitisation.
- Seven countries changed the rules associated with minimum or basic pensions or conditions related to income and means testing (e.g. Germany, Greece and the Slovak Republic). Two countries introduced a minimum or basic pension, and three changed the earnings or asset rules.
- Seven countries, for example Ireland and Israel, changed the tax incentives related to pensions. Among the measures taken are the abolition or implementation of tax exemptions for some categories of earners.
- Five countries, e.g. Japan and Turkey, took measures to increase the coverage of pensions, by using auto-enrolment, lowering or increasing the age at which contributions can be made or removing restrictions on participating in a pension scheme.

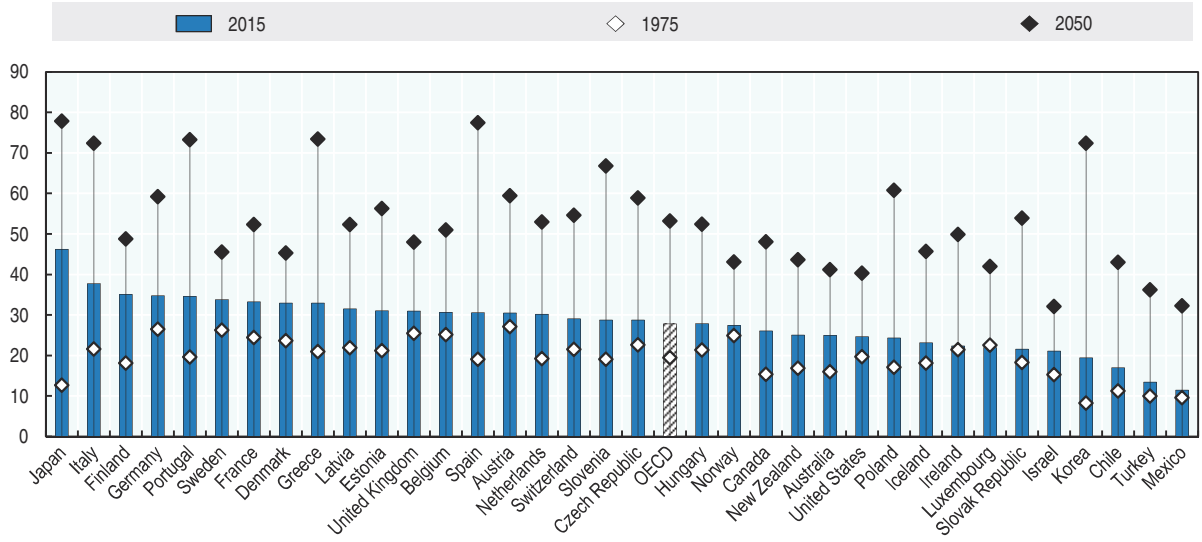
1.2. Setting the scene

Part of the reason for falling replacement rates and rising pension expenditure is the increase in longevity. Life expectancy at age 60 has increased from 18.0 to 23.4 years in the OECD since 1970, with gains ranging from 1.5 years in Latvia to 8.7 years in Korea. By 2050, average life expectancy at age 60 is expected to rise to 27.9 years. If retirement ages remain at the same level, more time will be spent in retirement and, with unchanged benefits, pension expenditure will rise. In addition, larger cohorts are entering retirement with the labour market exit of the baby boom generation and fewer people will contribute because of low fertility rates.

Overall, this will significantly raise the so-called old-age dependency ratio. This ratio, defined as the number of individuals older than 65 years for every 100 persons of working age (20 to 64 years), increased from 19.5 in 1975 to 27.9 in 2015 on average in the OECD. It is projected to accelerate and almost double until 2050 to 53.2 (Figure 1.1). It is, however, computed based on fixed age boundaries, and as such only captures demographic shifts. Changes in the effective old-age dependency ratio would be better reflected by adjusting age boundaries proportionally in line with rising effective retirement ages (e.g. by using the ratio of 67+ year-olds over 20-66 year-olds for a future period), which would show a less dramatic increase.

Figure 1.1. **The old-age dependency ratio will almost double in the next 35 years on average**

Number of people older than 65 years per 100 people of working age (20-64), 1975-2050



Note: The projected old-age dependency ratios differ based on the sources used. This report is based on UN data for comparison reasons. The largest differences are the following: according to Eurostat the old-age dependency ratio (65+/20-64) would increase by 39 and 19 percentage points between 2015 and 2050 in Spain and Austria, respectively, against 47 and 29 points with UN data. On the other hand, it would increase in Latvia by 33 points based on Eurostat against only 21 points with UN data.
Source: United Nations World Population Prospects: The 2017 Revision.

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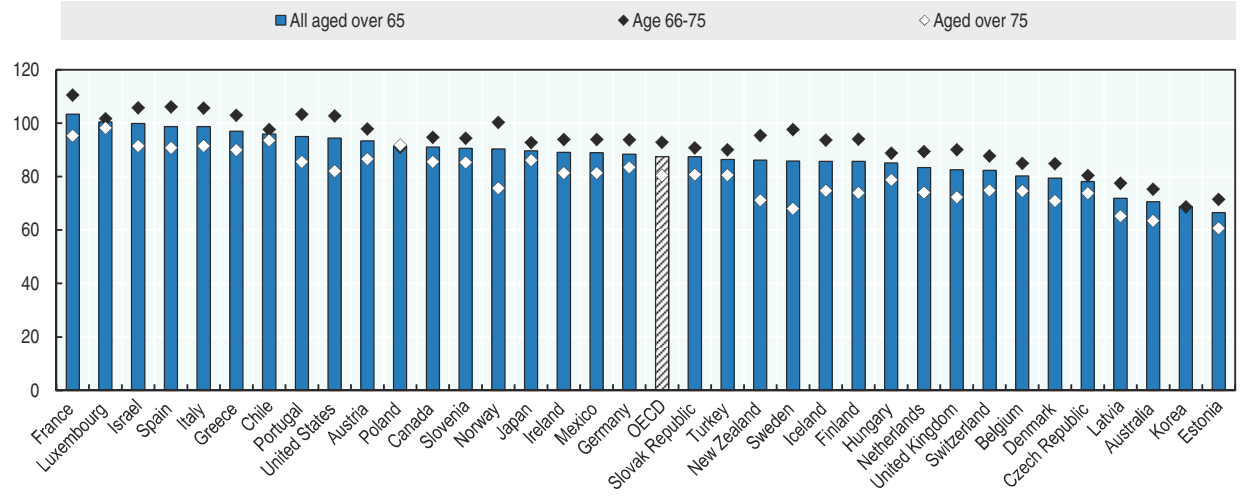
Changes in the age structure of the population drive the need for pension systems to continue to adjust. There are two determinants at the heart of this movement. First, fertility is low and is expected to stay below the population replacement levels (slightly above 2.0 births per woman in developed countries), even though the trough seems to have been reached at

the beginning of the century, around 1.6 on average in the OECD (indicator 5.1). Second, life expectancy continues to rise, with projections indicating an increase in remaining life expectancy at age 65 of about one year per decade.

To assess the impact of ageing on retirement incomes, it is useful to take a look at current retirees' incomes. The relative disposable income of older people differs significantly among countries. Those aged over 65 receive less than 70% of the economy-wide average income in Korea and Estonia, but slightly more in France and Luxembourg (Figure 1.2, indicator 6.1). On average, the average income of the age group 65+ is 12% lower than that for the total population. Older age groups (75+) earn significantly less than the 66-75 in all countries except Poland, and also Chile and Luxembourg. Large differences (20 percentage points and more) exist between 66-75 and 75+ in Finland, New Zealand Norway, Sweden and the United States.

Figure 1.2. **Average incomes of older people**

Disposable incomes of people aged over 65, % of total population incomes



Note: 2014 or latest available year. All income from employment, self-employment, capital and public transfers are included. Incomes are measured on a household basis and equivalised with the square root equivalence scale to adjust for differences in household size.
Source: OECD Income Distribution Database.

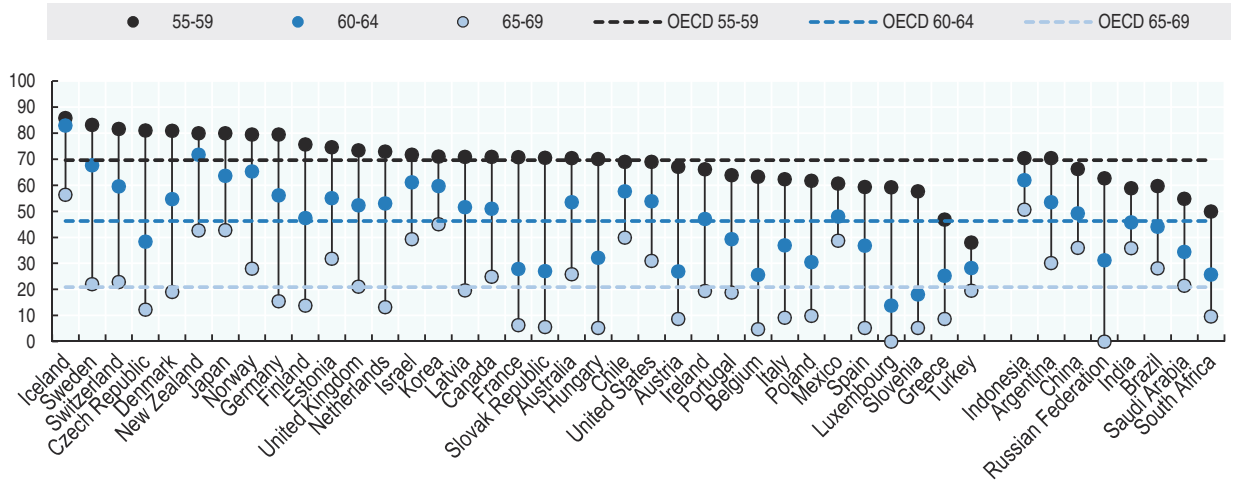
StatLink http://dx.doi.org/10.1787/888933633185

There are several reasons for the differences between the two age groups. First, a larger share of the 75+ age group is female: women's life expectancy is higher than that of men and older women often had short careers, resulting in low benefit entitlements. Second, in some countries pension systems are still maturing, meaning that not all older people have been covered during their working lives. Finally, employment rates drop sharply by age; even though employment rates of the 65+ age group is generally low in most OECD countries, it is still higher than employment rates of the 75+ age group.

Despite the large employment gains after age 55 since 2000 (Chapter 2), employment rates still fall sharply after age 60 (Figure 1.3). While in most countries, except Greece and Turkey, more than half the 55-59 year-olds work, this is only the case in half of the countries for the 60-64 and only for Iceland for the 65-69. Given that retirement ages are moving up in many countries it is important that employment follows suit. Extending working lives should therefore be on the forefront of the policy debate.

Figure 1.3. **Employment rates fall sharply with age**

Employment rates of workers aged 55 to 59, 60 to 64 and 65 to 69 in 2016



Source: OECD Employment Database.

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1.3. Recent pension reforms

OECD countries have enacted fewer pension reforms per year in the 2015-17 period than between 2009-15. Based on a simple count of the number of measures per year recorded in *Pensions at a Glance*, there has been a reduction of about one-third between the two periods. Even though such an accounting exercise gives little indication of the extent of pension reforms, it suggests that their pace has slowed. However, some countries have taken considerable steps towards a more financially sustainable pension system while others have improved retirement income prospects. Beyond age measures, the majority of reforms involved either changes in benefits, contributions or tax incentives. Canada, the Czech Republic, Finland and Poland, in particular, took measures with a potentially large impact. Overall, several reforms constituted a reversal of previous action.

Retirement age

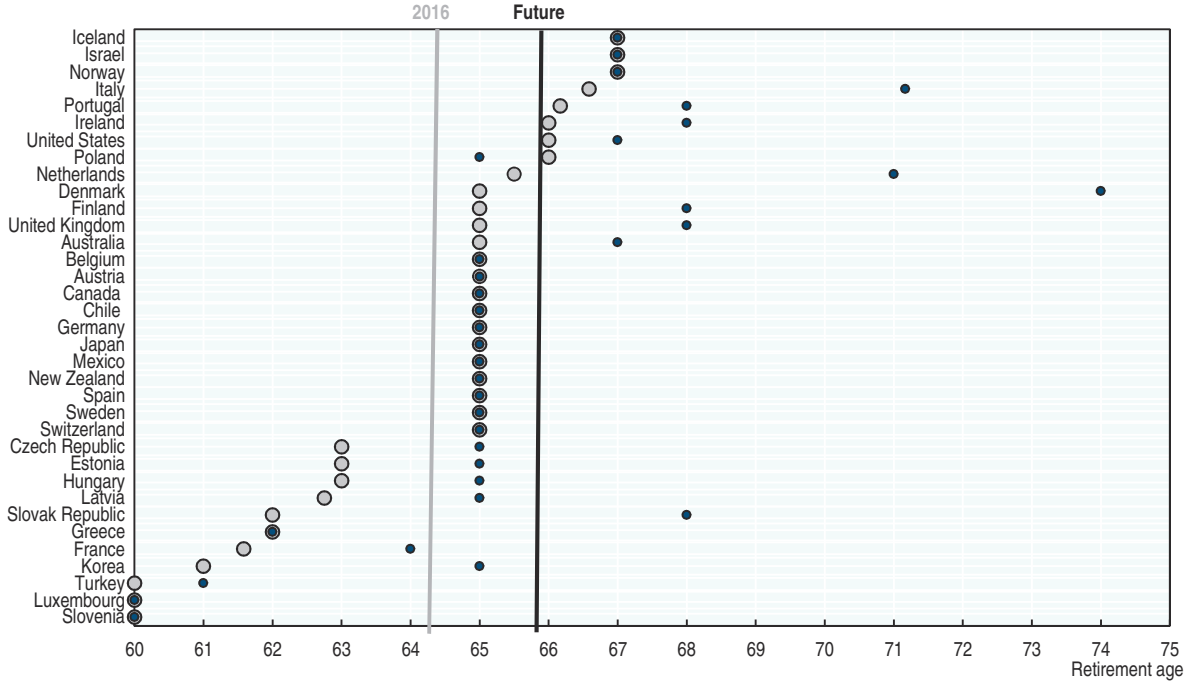
Many countries are increasing their retirement age. This can both enhance financial sustainability and – if translated into higher effective retirement ages – pension adequacy. Raising the retirement age in a defined benefit system tends to improve financial balances by boosting contributions and lowering total pension expenditure due to the shorter retirement period implied by the measure. Financial sustainability is not an issue in defined contribution systems but as pension entitlements need to be spread out over a longer period of time if life expectancy increases this automatically reduces pension income levels. This can then lead to boosting expenditure on first-tier pensions, generating public finance pressure possibly beyond the scope of contributory pensions. Increasing the retirement age might help to solve this problem.

During the last two years, several countries have taken steps to gradually increase the retirement age. Three countries have decided to increase the retirement age. Denmark will gradually increase it to 68 in 2030 and Finland from 63 to 65 by three months a year. In the Netherlands the pensionable age to receive a basic pension is increased to 67 and three months in 2022. Conversely three countries decided to reverse previously adopted

reforms. Canada chose not to implement the planned increase to 67 for the basic and means-tested pensions, the Czech Republic will no longer increase the pension age beyond age 65 and Poland reversed the planned increase to 67, with retirement ages dropping back to 65 for men and 60 for women. Moreover, in France, changes in rules to compute mandatory occupational benefits imply that the contribution period needed to get a full pension will increase by one year.

When taking into account all past legislated measures, and assuming a full career from age 20 in 2016, the normal retirement age (to become eligible for a full pension) is not planned to increase in 17 countries; three of which, Iceland, Israel and Norway, already have retirement ages of 67 (Figure 1.4).[4] However, most countries have previously agreed on fixed step increases for the coming years. Some have gone further and linked retirement ages to life expectancy afterwards: Denmark, Finland, Italy, the Netherlands, Portugal and the Slovak Republic. Based on this baseline scenario, three countries would have a future retirement age larger than 68 years (for the generation having entered the labour market in 2016): Denmark, Italy and the Netherlands. Overall, the future normal retirement age varies enormously from 59 years in Turkey (women only) and 60 years in Luxembourg and Slovenia to an estimated 74 years in Denmark. France and Greece will also have a normal retirement age below 65. On average across OECD countries, the normal retirement age would increase based on current legislation from 64.3 years today to 65.8 years for men and from 63.4 to 65.5 years for women (indicator 3.9). The 1.5-year increase represents slightly less than one-third of expected gains in life expectancy at age 65 during that period, which means about less than half of what is needed to stabilise the balance between the working and the retirement period.

Figure 1.4. **Retirement ages will increase in half of OECD countries, men**



Note: Normal pension age is calculated for a man with a full career from age 20. Future refers to the year in which someone is eligible for full retirement benefits from all mandatory components, without reduction, assuming labour market entry at age 20, this year differs by country.

Source: Indicator 3.10.

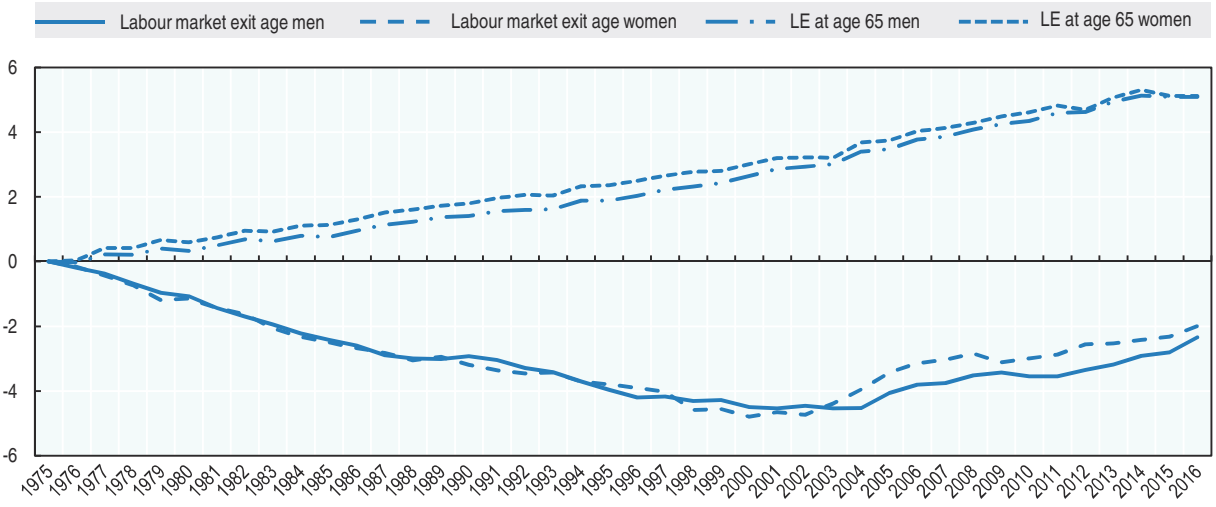
StatLink http://dx.doi.org/10.1787/888933633223

The increase in retirement ages over the past decades has contributed to enhancing employment of older workers. Although employment rates still decline steeply with age beyond 50 years, the employment rates of people aged between 55 and 64 have risen remarkably in most OECD countries over the last two decades and on average from 44% in 2000 to 58% in 2016 (indicator 5.7). Increases were larger than 20 percentage points in Austria, the Czech Republic, Estonia, Israel and Italy and larger than 25 points in Germany, Hungary, Latvia, the Netherlands and the Slovak Republic. Even during the global economic crisis where total employment performance was weak, employment rates continued to increase among older age groups.[5]

Higher employment at older ages broke the declining trend in the average age of labour market exit that had prevailed since the 1960s at least. Over the last 15 years, the average labour market exit age increased by about two years, recovering the levels reached in the early 1990s for men and mid-1980s for women. Yet, it is still lower today than it was 40 years ago when longevity was much lower. The diverging trends between the 1970s and the early 2000s of rising life expectancy and of decreasing labour market exit age – triggering a large increase in the duration of the retirement period – are at odds with the view that poor health is the current key obstacle to higher participation rates at older ages; this suggests that there is still a large potential to raise labour supply at older ages (Figure 1.5).

Figure 1.5. **Labour market exit ages and life expectancy have both increased over the last 15 years**

Changes in labour market (LM) exit ages and life expectancy (LE) at the age of 65 among men and women since 1975, average over 24 OECD countries in years



Note: The trend reversal that led to increases in the effective labour market exit age between the early 2000s and today can be found in most countries, but not all. The effective age of labour market exit was actually higher in 2000 than in 2016 for men in Denmark, Greece, Iceland, Japan and Mexico and women in Greece, Ireland and Mexico.

Source: OECD estimates. Labour market exit age data are based on the results of national labour force surveys, the European Union Labour Force Survey and, for earlier years in some countries, national censuses. Life expectancy data stem from *OECD Health Statistics* and are based on Eurostat data and national sources.

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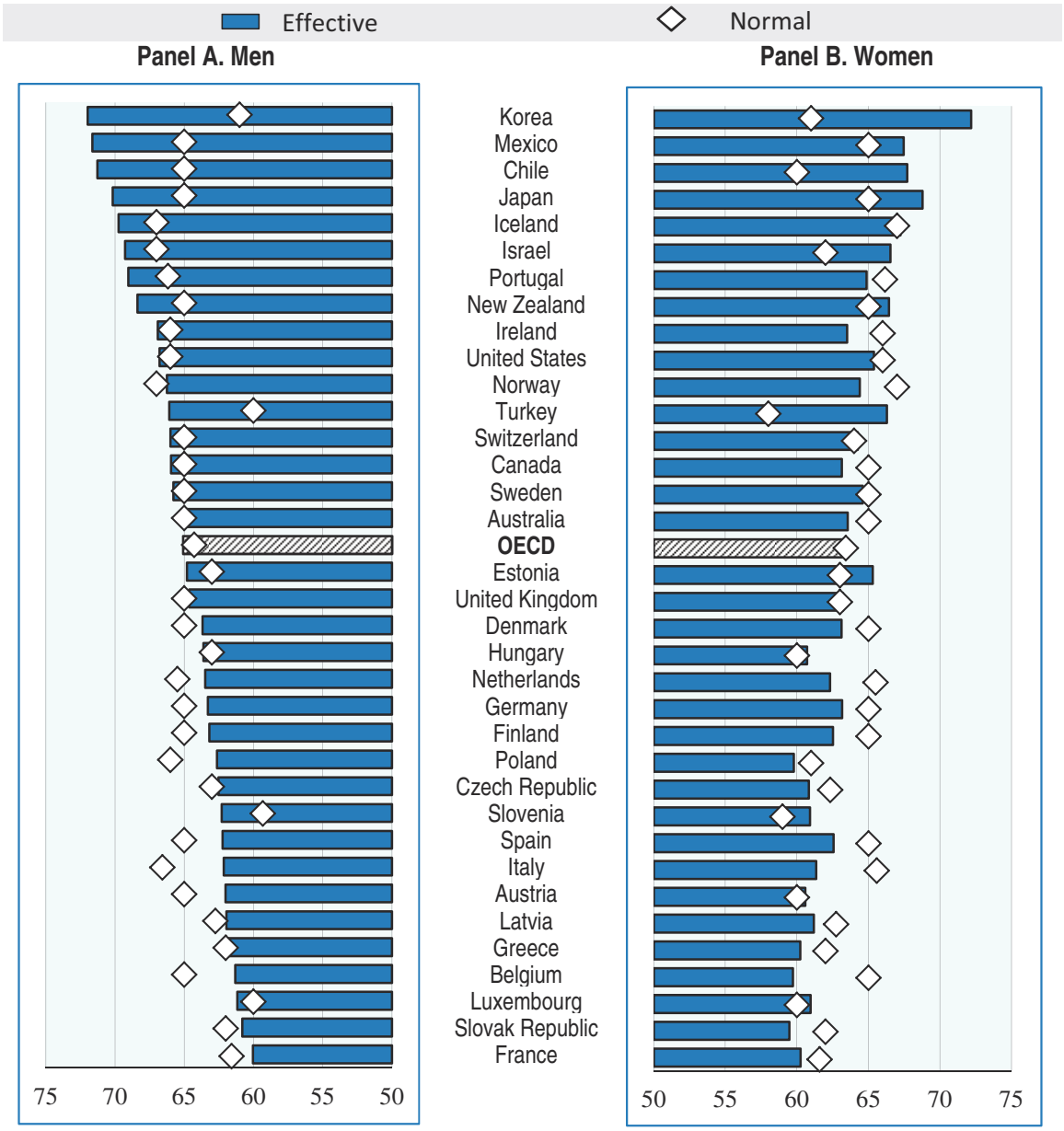
The average labour market exit age was equal to 64.3 in the OECD on average, and was 1.5 years lower for women than for men. However, beyond the OECD average statistics lay vast country differences. The average labour market exit age ranges from 60.2 in France and the Slovak Republic to 72.1 in Korea (Figure 1.6). It is lower than 62 years in Belgium,

France, Luxembourg and the Slovak Republic for both men and women, and higher than 66 years in Chile, Iceland, Israel, Japan, Korea, Mexico, New Zealand and Turkey.

Figure 1.6. **Average effective age of labour-market exit and normal pensionable age in 2016**



Source: OECD estimates based on the results of national labour force surveys and the European Union Labour Force Survey.

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Balancing financial sustainability and pension adequacy

There are other options than raising the retirement age to help reach the main objectives of pension systems. Even though the direct pressure of the financial crisis and the subsequent sovereign debt crisis in Europe subsided, many countries still took steps to improve the financial sustainability of their pension systems. At the same time, falling replacement rates prompted some countries to improve pension adequacy.

Pension benefits were, or are planned to be, changed in 12 OECD countries: Belgium, Canada, Finland, France, Greece, Iceland, Italy, Japan, the Netherlands, Portugal, Spain and Switzerland. The scope and direction of the benefit changes differ widely across countries. In France, the cost of the point (purchased by contributions) in occupational pensions has been exceptionally increased, beyond the usual wage valorisation, by 2% annually between 2016 and 2018. In Canada, future target replacement rates from the mandatory earnings-related component (Canada Pension Plan) for full-career workers earning up to about 1.25 times the average wage will increase from around 25% to 33%, thanks to increases in both contribution levels and ceilings. In Greece, pensions were cut by as much as 40% for those with a total pension of more than EUR 1 300 per month, equivalent to around three-quarters of average earnings. In Finland, accrual rates are being standardised across the entire working life, at 1.5%. Previously those aged 53 to 62 had an accrual of 1.9%, with those aged 63 to 68 getting 4.5%. In Belgium, the guaranteed interest rate within the voluntary scheme was reduced from 3.25-3.75% to 1.75%.

In several countries, benefit levels are linked to factors influencing total pension expenditure or total contributions. First, all funded defined contribution schemes automatically adjust the level of benefits to changes in longevity through the pricing of annuities. Second, an increase in life expectancy automatically lowers the newly granted pensions in countries with notional defined contribution systems, Italy, Latvia, Norway, Poland and Sweden. Third, Finland, Japan and Spain (sustainability factor) have introduced similar mechanisms in their DB pensions. Fourth, Italy, Latvia and Poland go further and uprate the notional accounts based on the growth rate of the wage bill or GDP.[6] Fifth, in Germany, Japan, Portugal and Sweden, there is an automatic adjustment of pensions to changes in the ratio of the number of workers per pensioner or to the financial balance of the PAYGO scheme. In Germany, Japan and Spain only, all pensioners, and not just new pensioners, have been affected by this adjustment of pension benefits.

Indexation rules were changed in only France and Japan. In France the adjustment of the occupational pensions is applied much later in the year and the period of reduced indexation has been extended for another two years.[7] In Japan, from April 2018 periods of deflation will be included in the indexation rules, but any unrealised benefit reduction because of a deflationary environment will be delayed to the next fiscal years, when the unused reduction can be applied as consumer prices rise. Moreover, in the Slovak Republic pension indexation was temporarily adjusted by 2% rather than applying the original indexation formula in 2017, which would have led to only a 0.3% increase.

Three countries changed the rules concerning minimum and basic pensions: Canada, Greece and the Slovak Republic. Canada increased the guaranteed income supplement for the lowest-income single seniors by over 10%, Greece introduced a flat-rate minimum pension, equivalent to over 20% of average earnings, and the Slovak Republic introduced a minimum pension from July 2015 for people who have at least 30 years of contributions.

Four countries changed the income and means testing rules of the pension system. Australia reformed the asset test for the Age Pension, increasing the threshold amount of assets before their pension is affected but simultaneously increasing the rate at which payments are reduced once this threshold is exceeded. In France and Germany the income test for combining work and pension has been relaxed. Finally, in Greece the means tested social assistance (EKAS) is being phased out.

Many countries changed contribution rates, but measures differed widely. Israel increased minimum contribution rates paid by both employers and employees, Hungary

reduced the social security contributions for employers, Finland reduced the rates for employers but increased them for employees and Canada increased the rates for both employers and employees to finance the earnings-related benefit increase. In Australia the annual contribution ceiling has been lowered.[8] Greece increased the contribution rates for the self-employed while Latvia changed the contribution rates for the self-employed and removed the contribution ceiling for funded DC schemes. In the Slovak Republic the ceiling to earnings on paying pension contributions increased from five to seven times the average earnings in January 2017.

Tax rules were altered in seven countries: Australia, Canada, France, Germany, Ireland, Israel and Latvia. Australia, in particular, has been very active in adjusting tax incentives. It established a cap of AUD 1.6 million on the amount of superannuation funds that can be transferred into the generally taxfree retirement phase, lowered the annual income threshold at which individuals pay an additional 15% contribution tax, extended retirement phase tax exemptions and changed the taxation of earnings for individuals using transition to retirement schemes. Canada introduced a tax deduction for the extra contributions made under the measures outlined above while France lowered the tax paid by employers on voluntary DC plans. Germany increased the tax incentives for employers of low earners to contribute to occupational pension plans: 30% of the additional contributions made (within the limits of EUR 240 and EUR 480 per year) can be deducted from taxes paid on wages.[9] Ireland scrapped the levy tax on pensions that was introduced during the financial crisis while Israel has reduced the tax advantages for high earners. Latvia increased the non-taxable part of the pension (from EUR 235 monthly in 2017 to EUR 300 in 2020), extended the private pension coverage of the self-employed and reformed the solidarity tax: before the reform the tax applied to earnings above the social security contribution ceiling while this solidarity tax will now also partly finance private pensions and health care.

Four countries took steps to increase coverage: Finland, Germany, Japan and Turkey. Finland decreased the minimum age for benefit accrual from 18 to 17 years whilst Germany concentrated on older workers by allowing contributions after the normal retirement age when continuing to work. Japan extended coverage of part-time workers and removed contribution restrictions to individual DC schemes, enabling non-working spouses, public-sector workers and those currently with only DB schemes to participate. Finally, Turkey introduced automatic enrolment of all wage earners under 45 into private DC pension plans.

Three countries changed the rules concerning early retirement. Austria introduced a partial pension for people 62 and over. Workers with at least 780 weeks of unemployment contributions are allowed to reduce hours between 40% and 60% without a reduction in earnings. Finland introduced a partial pension which allows people to receive 25% or 50% of their pension – which is on top actuarially adjusted – without work requirements from the age of 61. For those in arduous jobs early retirement can be taken from the age of 63 (and without actuarial adjustment). Germany reduced the age at which compensation payments paid by employees can be made from 55 to 50 to help individuals reduce the penalty for early retirement.

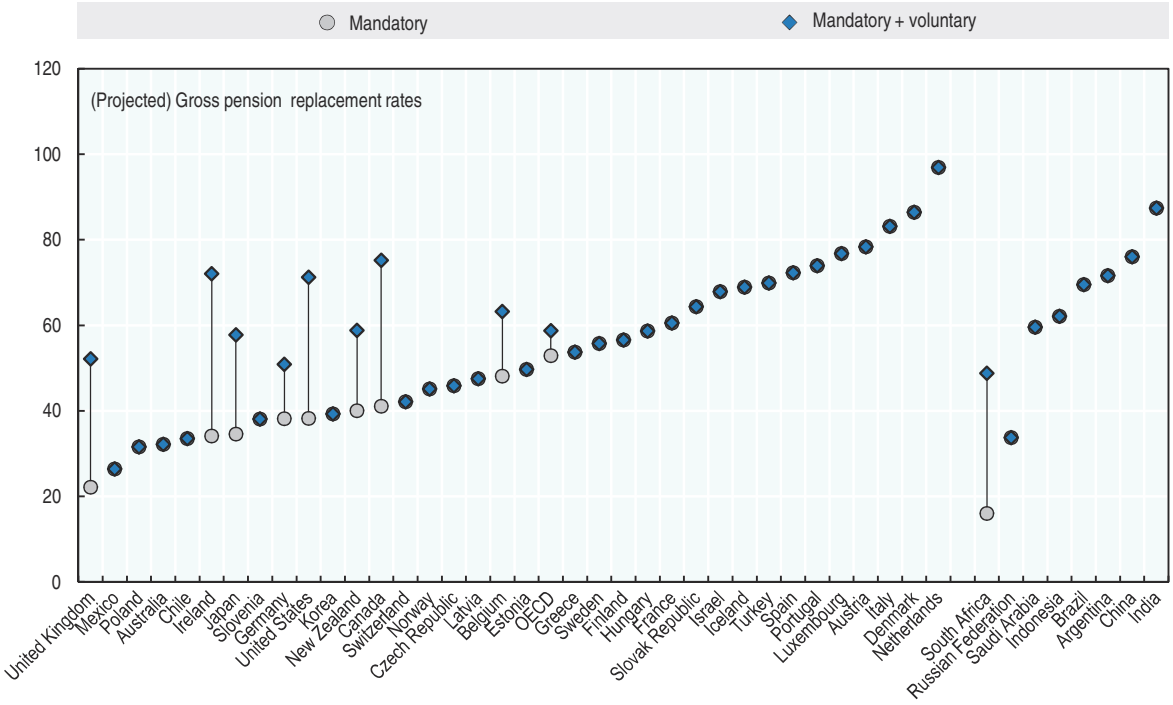
Replacement rates

The replacement rate is one measure of retirement income adequacy (for a comprehensive overview of all OECD pension entitlement indicators and the assumptions underlying their estimation, see Chapter 4). The replacement rate is equal to the ratio of the pension

entitlement to lifetime average earnings. Assuming that individual earnings grow in line with average earnings, lifetime average earnings are equal to the last earnings for full-career workers.[10] Future theoretical replacement rates are estimated assuming individuals have a full career starting at age 20 in 2016 until reaching the country-specific normal pensionable age (baseline case). This normal pensionable age is defined as the age at which individuals can first withdraw their full pension benefits, i.e. without actuarial reductions or penalties.

Figure 1.7 shows theoretical gross pension replacement rates across OECD and G20 countries for an average-wage worker. Gross replacement rates for mandatory pensions range from 22% in the United Kingdom to 97% in the Netherlands. In countries with significant coverage from voluntary private pensions – Belgium, Canada, Germany, Ireland, Japan, New Zealand, the United Kingdom, the United States and South Africa – being covered by a voluntary pension boosts future replacement rates by 26 percentage points on average for average earners.

Figure 1.7. **Future gross replacement rates for full-career average-wage workers in OECD and G20 countries**



Source: OECD calculations based on the pension model. See Chapter 4 for details.

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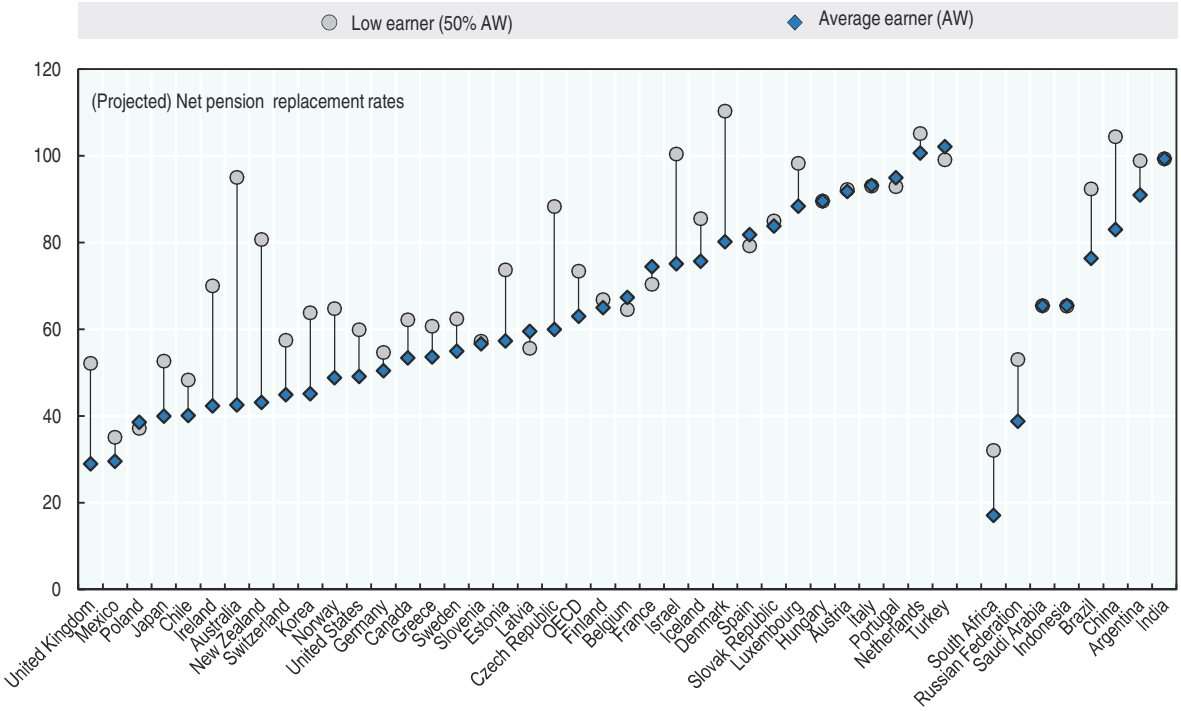
For the non-OECD G20 countries, South Africa has a very low gross replacement rate (16% for average earners) from the mandatory component. By contrast, projected gross replacement rates are 72%, 76% and 87% in Argentina, China and India, respectively. However, including the voluntary pension boosts the replacement rate for South Africa (49% across earnings levels for a full career).

The biggest reform implemented in the non-OECD G20 countries over the last two years is the 2015 reform in Indonesia, creating a mandatory pay-as-you-go defined benefit scheme. The new scheme was introduced on top of the existing mandatory defined

contribution scheme. Its accrual rate is 1% per year based on the career average wage (with past wages uprated by prices).[11]

As what matters in the end is disposable income both before and after retirement, net replacement rate is a better indicator of retirement income adequacy. Figure 1.8 shows theoretical net pension replacement rates across OECD and G20 countries for a full-career worker at either low or average earnings. The OECD average for net replacement rates from mandatory schemes for average-income earners is equal to 63%, ranging from 29% in the United Kingdom and 30% in Mexico to 102% in Turkey. Low-income (half the average wage) earners generally have higher net replacement rates than average-income earners, by 10 percentage points on average across countries, due to the progressivity of the tax-pension benefit systems that are in place in most OECD countries. Yet, the net replacement rate for low earners is projected to be below 50% (implying a very low pension even after a full career) in Chile, Mexico and Poland (see indicator 4.8 for more details).

Figure 1.8. **Future net replacement rates for low and average income earners in OECD and G20 countries**



Source: OECD calculations based on the pension model.

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1.4. Conclusion

In the last two years the pace of pension reforms across the OECD countries has slowed. As both the financial crisis and the subsequent sovereign debt crisis are subsiding, government finances are improving, taking off some of the direct pressure to reform. Still, most OECD countries have enacted pension reforms since the last publication of *Pension at a Glance*, including changes in benefits, contribution rates and the retirement age.

Increasing the retirement age is one of the key measures to address the challenges triggered by population ageing. Based on available data, the share of healthy life years in

remaining life expectancy at age 50 over the past 15 years has been broadly stable, which suggests that most countries have space to increase the pension age. In half of OECD countries the retirement age will rise in the future, including some countries which go a step further and link retirement ages to life expectancy, leading to a 1.5-year increase of the OECD average retirement age over the next decades based on legislated measures. This would, however, be insufficient to stabilise the balance between retirement and working life. Six countries adopted plans to change the retirement age in the last two years. However, in three of them previously planned increases in the retirement age have been reversed.

Many countries now also include automatic links between pension benefits and demographics, including changes in life expectancy or in the size of the workforce. This goes beyond built-in adjustments in defined contribution – funded or not – schemes and extends to some defined benefit or point schemes. This is a promising avenue as such links lessens the political pressure to ensure financial sustainability in the face of ageing.

However, if employment at older ages does not increase further, population ageing and the above measures will generate lower pension levels, thereby reducing well-being during retirement. It is therefore essential that efficient complementary labour market policies are put in place to maximise the use of substantial health-related work capacity at older ages in many countries (OECD, 2017). These policies should focus on limiting the impact of job losses, upgrading skills throughout the career, enhancing job quality and removing barriers to retain and hire older workers. The impressive increase in employment rates of those older than 55 since 2000 (Chapter 2) should therefore continue and extends to countries that are lagging behind.

OECD countries should not wait until the next crisis to implement the needed reforms to deal with increasing longevity, increasing risk of old-age inequality and changing work patterns. The OECD *Preventing Ageing Unequally* report suggests a range of policies to limit inequality in old-age, going much beyond pension policies. It adopts a life course approach highlighting that it is much more efficient to focus on preventive measures and tackle inequalities as early as possible than implementing more costly and possibly less effective measures to remedy their consequences at later stages. Yet, pension systems can play an important role in coping with old-age income inequality by: targeting adequate levels of retirement income for all retirees through a balanced combination of old-age safety nets, mandatory pensions, annuities in private schemes and pension credits; increasing pension coverage, especially for the self-employed and those with non-standard employment, including through improved financial literacy; weighing the importance of redistributive components given inequalities in life expectancy; designing survivors pensions carefully to protect widow(er)s effectively while limiting inefficient forms of redistribution and work disincentives; and moving towards a unified pension framework for all workers.

Notes

1. And other OECD pension publications such as *Pensions Outlook*.
2. European Commission (2015) expects pension expenditure to rise as a percentage of GDP until 2040 after which it would decrease and return to 2013 levels around 2060.
3. Countries with mandatory public and private pension contributions for both employer and employee below 10% include Australia, Canada, Korea and Mexico. The social insurance contributions in the United States (which include contributions for disability insurance) are also relatively low at 12.4%.

4. The normal retirement age is the age at which an individual is eligible for full retirement benefits from all mandatory components, without reduction, assuming full career and labour market entry at age 20.
5. There is some evidence that raising the retirement age during a recession has a negative effect on youth employment in the short run (Boeri et al., 2016). However, it is unlikely to have such an impact in the long run (Bertoni and Brunello, 2017).
6. By contrast, NDC accounts in Norway and Sweden are uprated in line with wages, which does not account with the loss of economic potential that might result from the changes in the demographic structure and affect the size of the labour force.
7. It is inflation minus one percentage point, rather than inflation though benefits cannot decrease while these benefits were frozen un nominal terms between 2014 and 2016.
8. The annual before-tax ceiling is lowered from AUD 30 000 if age < 49 or AUD 35 000 if aged 49 or older to AUD 25 000 regardless of age. If the before-tax ceiling is not reached in a given year the remaining amount can be carried forward for up to 5 years if superannuation balances are AUD 500 000 or less. The annual after-tax contribution ceiling is lowered from AUD 180 000 to AUD 100 000 after, and limited to individuals with a total account balance of less than AUD 1 600 000.
9. Additionally, the annual basic allowance for state subsidised pensions (*Riester-rente*) will be raised from EUR 154 to EUR 165.
10. This assumes that past earnings are uprated in line with average-wage growth and that workers maintain the same position within the wage distribution throughout their career.
11. Eligibility conditions include a minimum of 15 years of contributions and reaching the statutory retirement age (56 at the moment, increasing to 65). If contributions are made for less than 15 years the contributions are returned in lump sum.

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ANNEX 1.A1

Pension reform overview decided between September 2015 and September 2017

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Australia				July 2017. The annual concessional (before-tax) contribution ceiling is lowered from AUD 30 000 if age < 49 or AUD 35 000 if aged 49 or older to AUD 25 000 regardless of age. The annual nonconcessional (after-tax) contribution ceiling is lowered from AUD 180 000 to AUD 100 000. Starting in July 2018, unused concessional contributions can be carried forward for up to five years if superannuation balances are AUD 500 000 or less.	January 2017. The assets test, used to determine eligibility and benefit amounts for the Age Pension and other public pensions, was reformed. The changes provide an increase in the amount of assets a pensioner can hold before their pension is affected under the assets test. The changes also provide an additional increase in the assets test free areas for non-home owners. Support to pensioners with higher levels of assets is reduced, by increasing the taper rate (the amount by which payments are reduced) from AUD 1.50 to AUD 3.00 per fortnight per AUD 1 000 in assets over the free area.	July 2017. A AUD 1.6 million cap is established on the amount of superannuation funds that an individual can transfer into generally tax-free retirement plans. Savings above this limit can remain in the concessionally taxed accumulation phase or be moved out of the superannuation system. The retirement-phase tax exemption is extended to additional types of income stream products (for example, deferred lifetime annuities and group self-annuitisation products). However, the tax exemption for returns on assets used to support transition to retirement income streams is removed. A Low Income Superannuation Tax Offset is introduced for individuals with taxable annual incomes up to AUD 37 000. The annual income threshold is reduced at which individuals pay an additional 15% contribution tax from AUD 300 000 to AUD 250 000.	June 2017. The Pensioner Concession Card (PCC) is restored for individuals who lost entitlement to the concession card because of changes made to the social security assets test on 1 January 2017. The PCC entitles a holder to some health-related concessions, including medical care and prescription medication. State and territory governments also provide some concessions for PCC holders. To be eligible for a restored PCC under the reform, an individual must have been receiving a public pension immediately before 1 January 2017, have lost his or her pension directly because of the assets-test restructuring, and not otherwise be entitled to the PCC.
Austria	January 2016. Partial pensions (Teilpension) for employees aged 62 or older were introduced. Employees aged 62 or older with at least 780 weeks of unemployment insurance contributions in the prior 25 years are eligible to reduce their working hours by 40 to 60% without experiencing a similar reduction in their earnings.			January 2017. For workers who defer retirement, employee and employer contributions are reduced by 50% for up to three years (until age 68 for men and age 63 for women).The Pension Insurance Institution is responsible for financing the contribution reduction. At retirement, the pension will be based on the full contribution base.			January 2017. A working parent may transfer up to 50% of his or her pension contributions to a partner for the first seven years of the child's life; previously, such transfers were allowed only for the first four years.
Belgium			January 2016, the legal guaranteed minimum rate of return on contributions under occupational pension plans changes from a fixed rate to a variable rate. The variable rate is calculated based on the 24-month average annual return on 10-year "government linear ordinary bonds". It must be at least 1.75%.				

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Canada	June 2016. The age of eligibility will remain at 65 for the Old Age Security (OAS) pension and the Guaranteed Income Supplement (GIS). Reversal of a previously planned increase from age 65 to 67 from 2023 to 2029.		October 2016. Phased in 2019-25. The benefits of Canada Pension Plan (CPP) will increase from around one quarter to around one-third of a worker's average monthly pensionable earnings. The ceiling for insurable earnings will also gradually increase by 14% by 2025.	October 2016. From 2019 to 2023, the contribution rates for employers and employees will gradually increase from 4.95% to around 5.95%. Additionally, starting in 2024, employers and employees will each be required to contribute around 4% above the previous maximum pensionable earnings, up to a new upper earnings limit, which is projected to be 107% of the previous maximum pensionable earnings in 2024 and 114% in 2025.	July 2016. The Guaranteed Income Supplement (GIS) for the lowest-income unattached beneficiaries increased by CAD 947 per year, an increase of over 10% for single seniors with no or very little income.	October 2016. Phased in 2019-25. Employees will receive a tax deduction on the portion of contributions associated with the CPP enhancement. Employees will continue to receive non-refundable tax credits for existing CPP contributions. As well, the Working Income Tax Benefit will be increased to help low-income workers offset the cost of higher contributions for the CPP enhancement.	November 2016. Ontario implemented the Pooled Registered Pension Plans (PRPP) Act, providing a legal framework for creating and operating voluntary, low-cost, defined contribution pension plans for employed and self-employed persons who do not have access to a workplace pension. The law largely follows the framework of federal PRPP legislation that was passed in 2012. December 2016. Québec-based firms with 20 or more employees and who do not offer workplace pension plans were required to enroll their employees into the Voluntary Retirement Savings Plan (Québec's version of the federal PRPP) by 31 December 2016. Similar firms employing 519 employees have until 31 December 2017 to do so.
Chile							November 2017. Pension fund management companies (AFPs) are permitted to invest a greater share of their funds in so-called "alternative" assets. The AFPs can purchase infrastructure bonds and invest directly in closely held companies and real estate. At the same time, the maximum allowed share of alternative assets will immediately increase from 3% to 5% and potentially keep rising to 15%.
Czech Republic	June 2017. The retirement age increase will be capped at the age 65, reversing the earlier decision to increase by two months every year thereafter.						
Denmark	January 2016. It is no longer allowed to include mandatory retirement ages in employment contracts. November 2015. The retirement age will gradually increase to 68 between 2022 and 2030.						
Estonia							

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Finland	January 2017. Retirement age for the earnings related pension is raised (by three months a year) from 63 to 65 for those born after 1954. Future increases (of up to two months a year) are linked to life expectancy, also in the national basic pension system. The maximum age of pension insurance is raised from 68 to 69 for those born from 1958-1961 and to age 70 for those born after 1961. February 2017. Insured persons can choose to receive a partial pension of either 25% or 50% of their accrued pensions as early as 61 (rising to 62 in 2025 and to life expectancy afterwards). However, claiming a partial pension before the minimum retirement age permanently reduces benefits by 0.4% for every month of early partial retirement. February 2018. A years-of-service pension will be introduced for those in arduous occupations. Workers with at least 38 years of coverage will be eligible to retire at age 63 with no penalty if they can demonstrate that their capacity to work has diminished due to arduous work.	January 2017. The earliest age for benefit accrual and pension insurance for employees is reduced from 18 to 17.	January 2017. The benefit accrual rate is standardised at 1.5% of annual earnings for all age groups from 2026 onward. From 2017 to the end of 2025, the accrual rates are 1.5% for those aged < 53, 1.7% for 53-62 and 1.5% for 63+. Total earnings in benefit calculations are used (previously pension contributions were deducted). The monthly bonus for deferred benefits is applied at the minimum retirement age rather than the maximum age of pension insurance. Disability pension level increases as the retirement age rises. (the projected part of the pension is calculated to the retirement age).	January 2017. Until 2020 the contribution rates for the earnings-related pension will gradually fall for employers and rise for employees. Employers currently contribute a much larger share (on average 75%) to the program than employees. After all adjustments are implemented, the employers' average share will be about 70%. The contribution rates for the earnings-related pension have risen during past years but after the 2017 reform the contribution will stabilise approximately to the level 24.4%. For employees of age 53 to 62 the pension contribution will be 1.5% higher than for other employees until the end of 2025.	January 2016. The guarantee pension was increased by EUR 20.		June 2017. Pension assistance benefit is introduced providing income support for older long-term unemployed. To qualify for pension assistance, a person must have reached 60 and been entitled to unemployment benefits on before 1 September 2016; and collected unemployment benefits for at least 1 250 days from 1 September 2010, to 31 August 2016. Those who qualify receive a monthly benefit equal to the guaranteed minimum pension. The benefit ceases when an old-age, disability or partial pension is received or someone reaches 65. January 2017. A new pension act (JuEL) was created by merging the 4 main public sector pension acts. January 2016. Gradual increase in sailors' retirement ages starts and accrual rates decreased to the level of (TyEL).
France			January 2016. Agreement between social partners. The cost of a point used to calculate an individual's pension benefits is temporarily (from 2016 through 2018) increased by 2 percentage points annually, beyond the usual wage indexation. Beginning in 2016 the timetable for adjusting mandatory occupational pensions (old age and survivors benefits for ARRCO and AGIRC schemes) is pushed back from April to November each year and the formula (the rate of inflation minus one) for adjusting pensions is extended for another two years (but benefits cannot decrease).		January 2016. Earnings test for pensioners who receive both employment-related income and a pay-as-you-go public pension is relaxed. Pensioners who receive partial pensions and have employment-related income above a threshold will have their pensions reduced by the amount of income above this threshold. Previously, old-age pensions were fully suspended if employment-related income exceeded this threshold.	January 2016. The social tax (20% since 2012) that is paid by employers on voluntary DC savings plans (PERCOs) is lowered in some cases. For companies with fewer than 50 employees, the social tax will be lowered to 8% for a six-year period. The social tax will be lowered to 16% for companies whose PERCOs have at least 7% of their portfolio invested in instruments that help finance SMEs and provide a default option that will gradually lower investment risk as a worker ages.	January 2019. Social partners agreed to apply a reduction (10%) to the value of pension points, for the first three years of retirement until age 67, for employees retiring at the age at which they obtain the full rate in the general scheme. This reduction can be cancelled if the worker postpones his/her retirement by one year.

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Germany		January 2017. Individuals who work after the normal retirement age can choose to continue making pension contributions for higher benefits. Before, individuals who continued to work after the normal retirement age did not pay pension contributions. Employers contributed on their behalf, but the contributions had no effect on the level of benefits.		July 2017. The age at which workers may make compensatory payments (to boost early pensions) decreased from 55 to 50. Compensatory payments are lump sum or gradual payments that allow workers to retire early with less or no benefit reduction (normally 0.3% for each calendar month the pension is claimed before the normal retirement age) by prepaying their pension contributions.	July 2017. The old earnings test for workers aged 63 to 67 who continued to work while receiving a pension is replaced, making it more attractive to work. For those with annual earnings up to EUR 6 300 (USD 6 945.75), the full pension is paid; for those with annual earnings above EUR 6 300, the full pension is reduced by 40% of the additional earnings.	January 2018, for low-income earners (< EUR 2 000/month) a subsidy is introduced for additional employer contributions (between EUR 240 and EUR 480 yearly) to occupational pension schemes. 30% of additional contributions are deducted from the wage tax. January 2018, the annual basic allowance for state subsidised pensions (Riester-rente) will be raised from EUR 154 to EUR 165.	A partial exemption to private pension income (e.g., Riester-rente) for recipients of means-tested benefits was introduced. Not the full amount of the private pension income is taken into account when calculating the means-tested minimum income of the elderly, but EUR 202 per month are not subject to the means-tested income of the elderly.
Greece			May/June 2016. A reduction in benefits by as much as 40% for the approximately 200 000 pensioners who receive combined pensions of more than EUR 1 300 a month.	May/June 2016. The self-employed will have to contribute at the higher statutory rates (combined employer/employee, 20% of income), rather than the current fixed-income amounts (phasing in over five years).	May/June 2016, National flat-rate minimum pension of EUR 384 per month is introduced for workers who have at least 20 years of contributions at the normal retirement age of 67. A gradual phasing out of the means-tested social solidarity benefit (EKAS) by 2020. As a start, stricter eligibility criteria means that current beneficiaries with non-EKAS (combined main plus auxiliary) pension income greater than EUR 664 per month are no longer eligible.		
Hungary				January 2017. Reduction of the social security contribution rate for employers from 27% to 22%.			
Iceland			December 2016. The civil servants pension fund (Adivision) is transformed from DB fully guaranteed into DC not guaranteed with age based accrual rate instead of flat rate accrual. Bdivision of civil servants pension fund, which was closed for new members in 1997, is not part of this reform.				

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Ireland						October 2015. The Finance Minister announced that the pension levy will be abolished at the end of 2015 because the levy has accomplished its goal of improved public finances. The levy applied to voluntary private-sector pension plans as well as to voluntary personal retirement savings accounts.	
Israel				1st half 2016. Minimum mandatory contribution rates for DC occupational pension plans have increased for both employers (6.0% to 6.5%) and employees (5.5% to 6.0%). Additionally, employer contribution rates are harmonised across different types of retirement plans.		1st half 2016. Tax relief for higher earners reduced.	1st half 2016. Employer responsibility for retirement plan administrative costs increased.
Italy			January 2017. The 14th-month payment is increased for pensions up to EUR 750 a month and is extended to pensioners with an income of up to twice the INPS minimum (~EUR 1 000). Those with benefits of less than EUR 750 a month and less than 15 years of contributions will receive EUR 437, EUR 546 for those with 15-25 years of contributions and EUR 655 for those with more than 25 years of contributions. Those with an income between EUR 750 and EUR 1 000 will receive a 14th-month payment (which they were not eligible for previously) of between EUR 336 and EUR 504.				

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Japan		January 2017. Restrictions on individual DC plan participation will be removed to allow contributions from non-working spouses, public-sector workers, and individuals currently covered only by private DB plans. April 2017. Mandatory coverage of part-time employees (EPI system) will be extended to companies with fewer than 500 employees. To qualify part-time employees must work at least 20 hours a week and earn JPY 88 000 (USD 752) or more per month.	From April 2018 periods of deflation will be included in the indexation rules, but any unrealised benefit reduction because of a deflationary environment will now be delayed to the next fiscal year or later, when the unused reduction can be applied with consumer price inflation. From April 2021, the Wage/Price Indexation is revised. Pensions are adjusted downward when wages decline.	January 2018. Contribution limits will be redefined from a monthly to an annual basis to allow for more flexible contribution arrangements.			January 2017. The rule that allows individual DC plan participants with modest balances of up to JPY 500 000 (USD 821.35) to cash out if they stop working is eliminated. April 2019. New mothers will be exempted from paying National Pension contributions for four months before and after childbirth.
Korea							
Latvia		From 2018 the self-employed earning below the minimum wage will be included in the private pension scheme, though remain outside the public scheme.		Currently the self-employed earning above the minimum wage pay full pension contributions on all earnings. From 2018 they will pay full contributions (20%) on earnings up to the minimum wage, and 5% for earnings above and the self-employed earnings below the minimum wage will pay 5% to the private pension scheme. From 2018 the contribution ceiling for employees will be removed, with 6% and 4% of earnings above this level now going to the DC and private pension schemes, respectively.		The non-taxable allowance for pensioners will increase gradually from EUR 235 a month in 2017 to EUR 300 a month in 2020.	
Luxembourg							

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Mexico							Creation of a new pension fund for employees aged 60 years or older near to retirement (SB0). In total, each asset manager has to propose five pension funds, which by default are targeted to people of different age groups (SB4: < 36 years old; SB3: 37-45 years old; SB2: 46-59 years old; SB1: > 60 years old; SB0: > 60 years old near to retirement). SB0 started operations in 2015 to protect the savings of workers close to retirement. Since 2017, workers can change to any pension fund, even if it does not match with their age, so they have freedom to choose the investment strategy according to their risk preferences.
Netherlands	January 2016. The retirement age for the basic pension is raised to reach 67 in 2021. After that it will be linked to life-expectancy, with each increase announced five years before. The retirement age will reach 67 and 3 months in 2022.		September 2016. Variable annuity option for defined contribution (DC) occupational pension plans is introduced. DC pension plan participants will be able to choose between: 1) a fixed annuity providing a guaranteed level of income until the end of life; 2) a variable annuity that allows retirees to invest in risk-bearing assets and provides a level of income that is adjusted according to the performance; or 3) a combination of the both.				
New Zealand				May 2015. Removal of the kick-start contribution in KiwiSaver accounts.			
Norway							November 2017. A new scheme for individual pension savings is introduced. Individuals will receive a deduction in capital income up to NOK 40 000 a year for payment to the scheme. Pensions paid from the scheme are taxed as capital income. The new scheme substitutes a more limited scheme.
Poland	October 2017. Reduction of the retirement ages to 60 for women and 65 for men.						

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Portugal	October 2017. Early retirement rules for public old-age pensions is amended to allow individuals with 48 years of contributions (or 46 years if they began contributory employment at age 14 or younger) to receive full benefits as early as age 60.		2017. Pensions below or equal to 1.5 times the Social Support Index are increased by maximally EUR 10. The sustainability factor for disability pensioners at the date of the respective conversion into old-age pensions is eliminated.				March 2017. Indexation rules are adjusted. Previously more generous indexation was applied to those earning less than 1.5 times the IAS (social support index) this threshold is increased to 2 times the IAS.
Slovak Republic				January 2017. A ceiling to earnings on paying pension contributions has increased from five times to seven times average earnings.	From 1 July 2015 there is a minimum pension benefit for old-age pensioners and invalidity pensioners that reached retirement age. Conditions for beneficiaries to increase the pension up to the minimum pension: at least 30 years of qualified pension insurance period completed, the amount of pension income is lower than the amount of the minimum pension and all qualified pensions are claimed.		
Slovenia							
Spain			January 2016 Introduction of new "maternity complement". This new complement is applicable to all new contributory pensions recognised to women with children.				
Sweden							
Switzerland			The guaranteed interest rate within the mandatory occupational pension scheme was reduced from 1.75% in 2015 to 1.25% in 2016 and to 1% in 2017.				

	Retirement age	Coverage	Pension benefits	Contributions	Minimum and basic pensions, income and means testing	Taxes	Other
Turkey		January 2017. Automatic enrolment of all wage-earners younger than 45 into private DC pension plans. Employees will automatically contribute 3% of their gross income to private pension plans chosen by their employers. Employees can choose to opt out (within the first two months). The government will match 25% of an employee's contributions and will make an additional one-time contribution of TRL 1 000 (USD 337.73) for those who do not opt out.					
United Kingdom							April 2017. Introduction of Lifetime Individual Savings Accounts (LISA), voluntary privately managed savings, open to individuals aged 18 to 40. Up to GBP 20 000 (USD 24 624) can be saved per year, with the government providing a 25% bonus on the first GBP 4 000 (USD 4 925). LISA savings are for retirement (when reaching 60) or for a first home purchase (at any age).
United States							

Pensions at a Glance 2017
OECD and G20 Indicators

Chapter 2

Flexible retirement in OECD countries

This chapter looks at flexible retirement in OECD countries. First, it looks at how people work and retire in OECD countries. Second, it looks at the existing flexible retirement options in OECD countries. It looks at combining work and pensions before and after the retirement age and the flexibility to choose when to retire. Third, it looks at people's preferences regarding flexible retirement and the actual use of these programmes. Finally, it draws conclusions.

2.1. Introduction

Governments around the world have been increasing standard pension ages and closing down routes into early retirement. As documented in Chapter 1, more and more countries are moving beyond an official pension age of 65, as they seek to strike an appropriate balance between time spent in work and in retirement. In part, this is a financial calculation: in a context of rising life expectancies and ever-larger elderly populations, measures are required to improve the financial sustainability of pension systems and to limit the cost of supporting retirees borne by current and future generations of workers. However, it also reflects the fact that older people are leading healthier and more active lives.

Imposing a fixed retirement age might not be beneficial for all. Advocates of retirement "à la carte" point to the diversity among older workers. Some are able and motivated to work longer for the income, the social interactions or simply because they like their job; others want to stop working earlier because of health problems, to pursue other interests or, as is increasingly the case, to care for elderly relatives or grandchildren.

These differences between people have prompted calls for flexible retirement arrangements that allow individuals to choose when and how to retire. In its most common use, the term "flexible retirement" refers to the ability to draw a pension benefit – full or partial – while continuing in paid work, often with reduced working hours. This is also known as "gradual", "phased" or "partial" retirement. A second dimension of flexibility refers to the moment of retirement – allowing people to draw a pension before or after the official pension age. Some countries already have introduced an age range within which workers are free to choose when they retire.

A large share of workers wants greater retirement flexibility. A recent survey found that 43% of respondents aspired to continue working past retirement in Japan, whereas in France only 15% were considering this (Aegon Center for Longevity and Retirement, 2015). Meanwhile, almost two-thirds of EU citizens would prefer to combine a part-time job and partial pension than to fully retire (Eurofound, 2016). In part, disparities in preferences for flexibility across countries are likely driven by the design of pension systems in each country: the level of pensions available at different ages and the gains from working longer play an important role in shaping workers' attitudes towards flexibility. For example, earnings limits, which limit the amount that can be earned before pension benefits are cut, can reduce the incentive to work beyond the official retirement age.

Yet individuals are not motivated to work longer solely by financial gain; doing so can improve life satisfaction. Workers over the age of 45 experience less stress and greater life satisfaction, on average, than younger workers in several European countries and the United States (Nikolova and Graham, 2014).[1] This holds for full-time workers, voluntary part-time workers and the self-employed. However, although still positive, the differences compared to younger respondents diminish for the ages 66 and older. The drop for full-time workers is particularly steep, indicating that for some, continuing to work might not have been a voluntary decision.

Many employers see benefits in retaining older workers. Older workers are more experienced and can preserve and transfer knowledge to younger workers. In countries where population ageing has already advanced considerably and shortages of qualified staff are looming, such as Japan and Germany, employers are stepping up efforts to keep older workers on the payroll, in part because re-employing workers who have already retired in response to staff shortages can be complicated and expensive. At the same time, technological advances are facilitating flexible retirement by making it easier for individuals to work from home and by reducing physically demanding aspects of work.

Yet employers may also have reservations about retaining older workers. Age discrimination is still common in many workplaces, as is prejudice regarding older workers' productivity and their ability to adapt to new challenges.[2] In many countries, part-time work at older ages is rare: pension rules regarding the timing of retirement are rigid and workers face a binary choice: to retire or continue working. Moreover, mandatory retirement rules give employers the option to terminate contracts of older workers at a certain age,[3] though data limitations prevent us from knowing how often employers actually use mandatory retirement to let go of older workers.

From a government perspective, flexible retirement is a double-edged sword. On the one hand, it increases people's well-being and incentivise people to work longer than they would have otherwise. This can, in turn, increase workers future pension entitlements, which is particularly important for those with patchy careers and contribution histories. They would also keep contributing to economic growth and generating tax revenues. On the other hand, introducing flexible retirement might prompt individuals to retire early and into poverty if they underestimate their financial needs in retirement even if the rules are set in a way that is actuarially neutral (see Annex 2.A1). This might also happen to workers who draw a partial pension while still working and then find the final pension benefit at full retirement insufficient. Early-retirement options might not be socially equitable if only the better-off can afford to retire early while other workers still need to work.

This chapter starts in Section 2.2 by examining the context for flexible retirement policies, such as labour market participation and health status among older workers in OECD countries. Section 2.3 examines the various options for flexible retirement in OECD countries and discusses the impact of different forms on pension entitlements. Section 2.4 analyses attitudes towards flexible retirement among employees and employers and compares these preferences to how flexible retirement schemes operate in practice. A concluding section sets out policy recommendations. Full details of the rules that apply for retirement and for combining work and pensions are provided in Annex 2.A1 in the annex.

2.2. How do people work and retire in OECD countries?

There are large differences in the way older people work and retire, not only differences over time but also between socio-economic groups, not only differences among older workers' labour market participation but also in terms of life expectancy. This has an effect on the effective age of labour market exit, the time spent in retirement and ultimately the scope for introducing or expanding flexible retirement options.

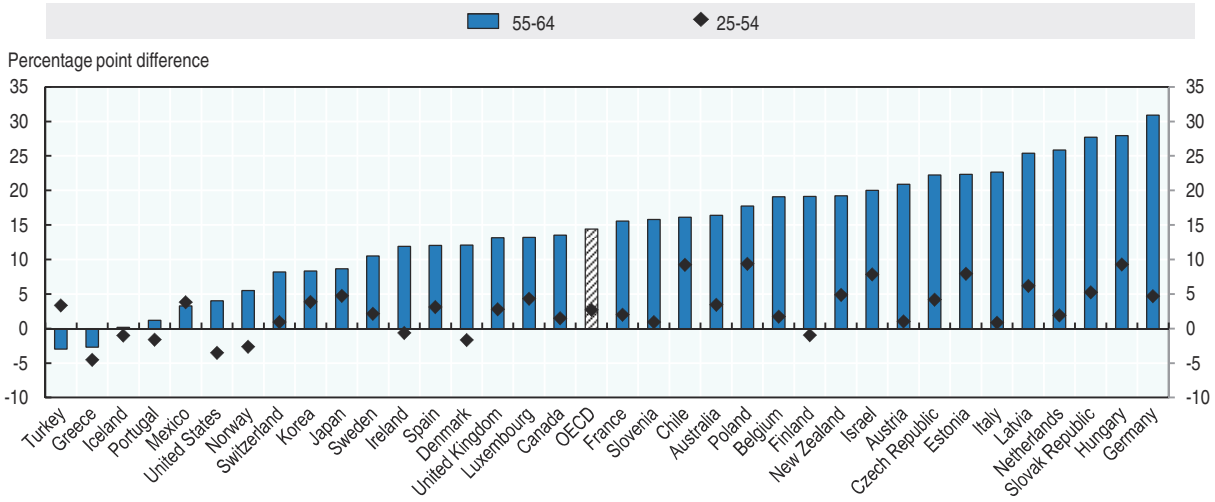
Older workers constitute a larger proportion of today's labour force

Since 2000, labour market participation among older individuals has increased significantly while unemployment among this group has remained low in most OECD

countries, even if the incidence of long-term unemployment remains high. The employment rate among individuals aged 55 to 64 grew by more than 14 percentage points, from 44.0% in 2000 to 58.4% in 2016 (Figure 2.1). For people aged between 25 and 54, it increased by far less – from 76.8% to 79.5%. Older workers are therefore catching up, but they still have below average employment rates. In contrast to historic trends, older workers' participation increased rather than declined in the aftermath of the global financial crisis (OECD, 2013).

Figure 2.1. **Growth of employment rates of older workers has been strong**

Change in employment rates, 2000-2016, percentage points



Source: OECD.Stats database, Labour Force Survey by gender and age.

StatLink http://dx.doi.org/10.1787/888933633318

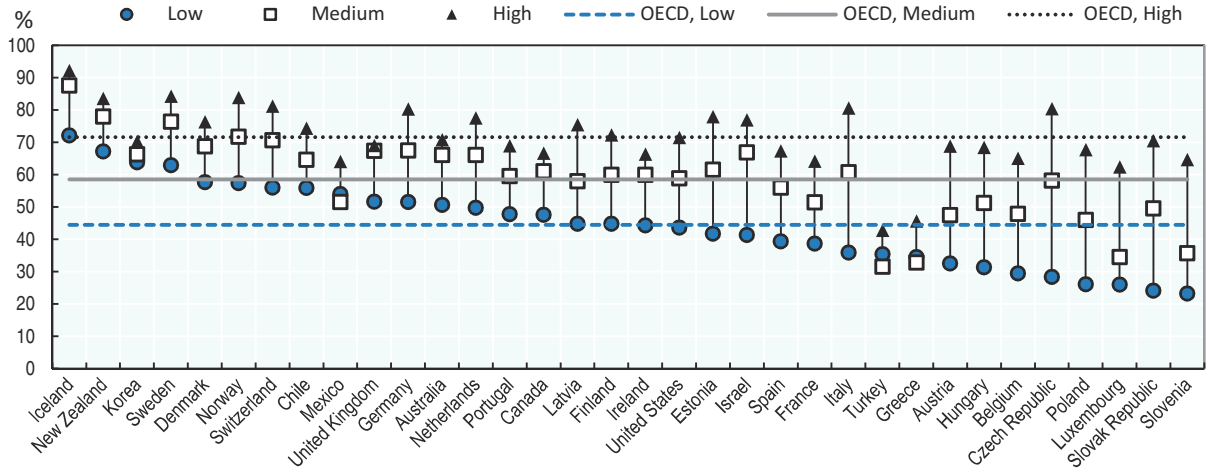
On average, 55-64 year-olds at all levels of educational attainment experienced an increase in employment between 2000 and 2016.[4] However, significant differences exist between countries: employment rates increased more among the less educated than the highly educated in Denmark and Luxembourg, while the opposite occurred in Estonia, Italy, Korea and Poland.

However, despite this overall positive picture, older workers with low educational attainment are much less likely to be in employment than their better-educated peers, although employment rates among this cohort varies substantially across countries (Figure 2.2). In 2016, the average employment rate across OECD countries among 55-64 year-olds with low levels of education was 44%, compared with 59% and 72% among those with medium and high levels of education, respectively. Employment rates among older workers with low educational attainment were below 30% in Belgium, the Czech Republic, Poland, Luxembourg, the Slovak Republic and Slovenia. By contrast, they exceeded 60% in Iceland, New Zealand, Korea and Sweden.

Despite an overall increase in female labour force participation, older women still work less than men in most countries at all education levels. On average across OECD countries, the gender employment-rate gap among the 55-64 age group in 2016 was slightly higher for the less educated at 15 percentage points (p.p.) against 12 and 10 p.p., respectively, for the mediumand highly-educated. The gender employment-gap exceeded 25 p.p. for the low-educated in Chile, Ireland, Italy, Mexico and Turkey.

Figure 2.2. **Employment rates among older people rise with educational attainment, 2016**

Rates as percentages of the population aged 5564 by level of educational attainment



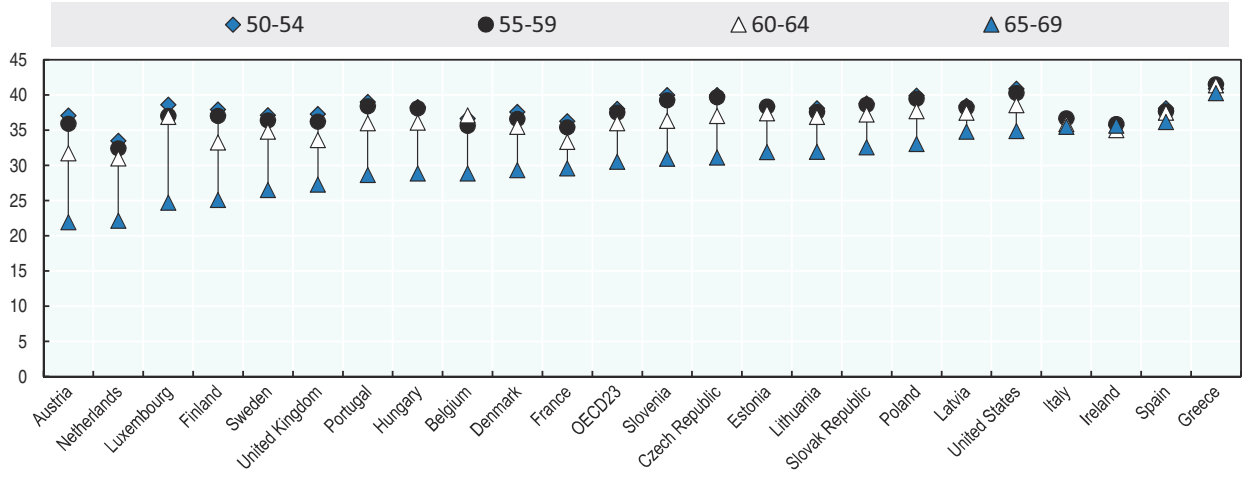
Note: "Low" denotes below upper-secondary education, "Medium" upper-secondary and post-secondary non-tertiary education, and "High" tertiary education. 2015 data for Chile and Ireland.

Source: OECD (2017), "OECD Education at a Glance: Educational attainment and labour-force status" (dataset).

StatLink http://dx.doi.org/10.1787/888933633337

In most OECD countries, employed workers aged 60-64 work only slightly fewer hours per week on average than those aged 50-54 (Figure 2.3). The difference in hours worked between these two age groups exceeds four hours in only two OECD countries in the sample: Austria and Finland. In Hungary and the United States, 50-54 year-olds work about 38 and 41 hours per week on average, respectively, while those aged 60-64 report an average of 36 and 39 hours worked per week. At the same time, employment rates fall sharply in people's 50s and 60s in many OECD countries (OECD, 2018); the main changes in labour supply occur on the extensive margin and not on the intensive margin, meaning most older individuals stop working altogether rather than gradually reduce their working hours as they get older.

Figure 2.3. **Hours worked per week among employed workers, 2015**



Source: Calculations based on EU-LFS.

StatLink http://dx.doi.org/10.1787/888933633356

Only 21% of the age group 65-69 are in employment in 2016 across the OECD (Figure in Chapter 5). However, employment rates for this age group as well differ widely by country. Employment rates exceed 40% in Chile, Iceland, Japan, Korea and New Zealand. The rate in Iceland is highest, at 56%, whilst the lowest rates (of around 5%) are found in Belgium, Hungary, Luxembourg, Slovenia and Spain.

For those still in employment after the age of 65, the average number of hours worked per week declines significantly in most countries, suggesting a gradual withdrawal from the labour market. In Austria and the Netherlands, for example, individuals aged 65-69 worked about 22 hours per week in 2015 and in Luxembourg just under 25 hours. However, working hours among different age groups are similar in Italy, Ireland, Spain and Greece, indicating that people who remain in employment at older ages continue to work full-time. In most of these countries, the retirement age is 65 or lower; as a result, many older workers already exited the labour market.

The manner in which workers exit the labour market differs across socio-economic groups. In the majority of OECD countries, highly-educated prime-age individuals work longer hours than their loweducated peers (OECD, 2018). At older ages, the situation is different: there are numerous countries in which low-educated 65-69 year-olds work more hours per week than highly-educated coworkers of the same age, implying that highly-educated workers in these countries reduce their working hours at a faster rate than workers with low-educational attainment. This finding might suggest that less-educated workers are less often in jobs that can be adapted to phased-retirement programmes and/or are forced by financial circumstances to work longer hours at older ages than workers with higher educational attainment.

Inequality in life expectancy remains high while healthy life expectancy has increased significantly

Life expectancy at all ages has increased at a rapid pace around the world in recent decades. Life expectancy at age 65 increased by more than five years on average for both men and women over the last four decades. Over the period 2010-15, a 65-year-old woman could expect to live at least 22 more years on average in Korea, Australia, Switzerland, Spain, Italy, Chile, France and Japan but less than 19 more years in Hungary, the Slovak Republic, Latvia and Turkey. Women's longevity relative to men widened between 1960 and the mid-1980s but has levelled out since then (OECD, 2017a).

There are still large socio-economic differences in longevity. New OECD work shows that inequality in remaining life expectancy across socio-economic groups is much larger than previously estimated (OECD, 2017a). At age 65, highly-educated men can expect to live about 3½ years longer than men with low educational attainment. For women, the corresponding gap is lower, at 2½ years.

Furthermore, individuals with low educational attainment are at higher risk of disability, raising important questions for pension policy makers regarding whether longer-lived age cohorts will spend their extra years of life in good or bad health. If living longer simply means being ill or disabled for more years, it would not be realistic to expect workers to keep on working to older ages.

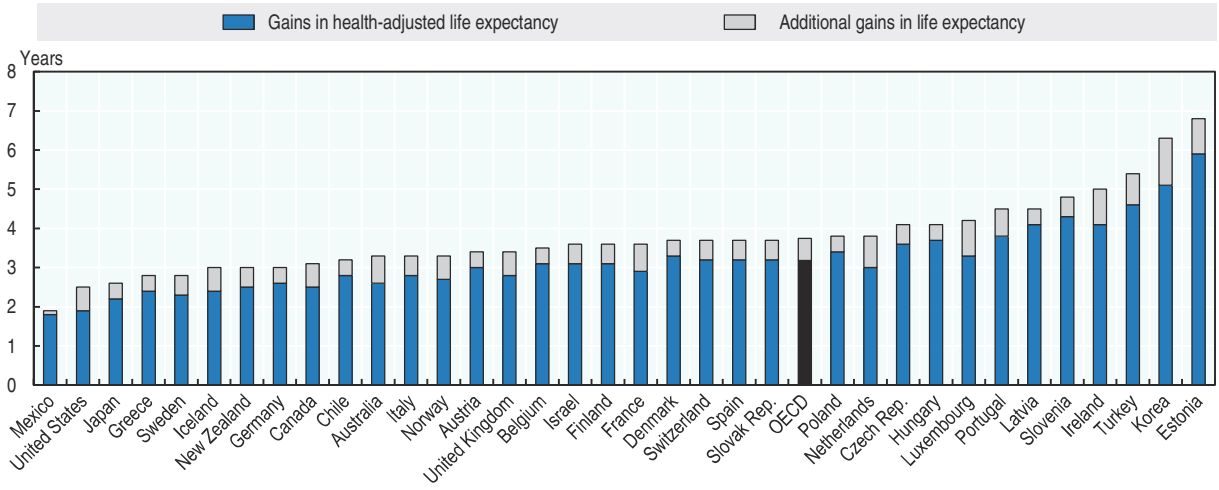
However, a large share (85%) of the gains in life expectancy at birth in OECD countries since 2000 is estimated to have been spent in good health, i.e. free of disability (Figure 2.4). This implies that the share of healthy years in total life years has been stable. Of course

with age, the share of healthy life years in remaining life expectancy decreases. In the 25 European OECD countries, on average, almost 40% of 50-year-old men's and 47% of women's remaining life expectancy was impaired by limitations on activities in 2014. Overall, the number of healthy life years has increased since 2005, but the ratio of healthy life years over remaining life expectancy at age 50 has only fallen slightly for both men and women (OECD, 2017a).[5]

Similar to the patterns observed for life expectancy, there are also large socio-economic differences in self-reported health (Figure 2.5). The gap in the share of people reporting good health between lowand high-income individuals averages 19 percentage points in OECD

Figure 2.4. **Extra years of life expectancy have been largely in good health**

Total gains in life expectancy at birth, OECD countries, 2000-15



Note: Countries are ranked in ascending order of life expectancy gains. Health-adjusted life expectancy is defined as the number of years that people can expect to live in "full health" by taking into account years lived in less than full health due to disease and/or injury.
Source: OECD (2017a).

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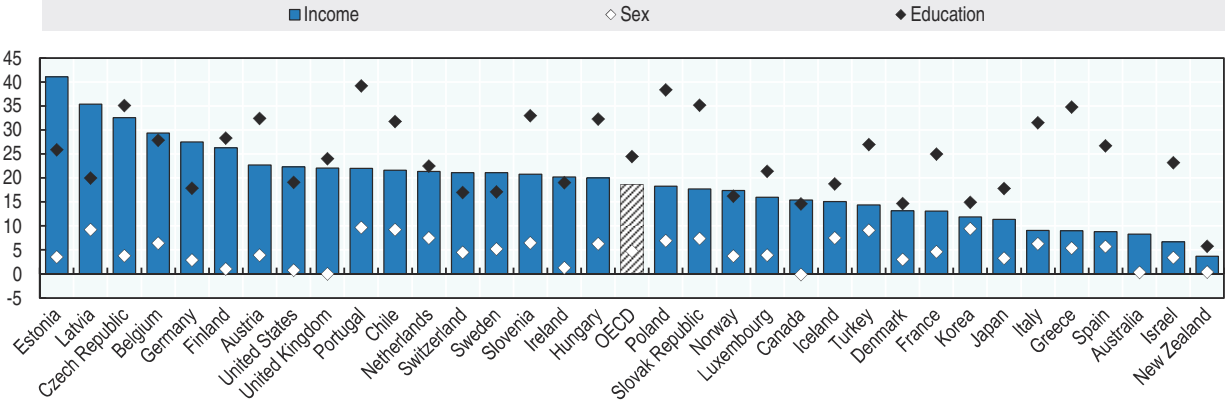
Figure 2.5. **Self-reported health differs widely by gender, income and education**

Difference in the share of population reporting good health based on income, gender and education, percentage points, 2015



Note: Gender is defined as the difference between men and women, income is the difference between the 5th income quintile and the 1st income quintile and education is the difference between high and low educated.
Source: *OECD Health Statistics*.

StatLink http://dx.doi.org/10.1787/888933633394

countries, reaching 41 percentage points in Estonia. The difference between individuals with low and high educational attainment is even larger, with an OECD average difference of 25 percentage points.

Men are more likely to report good health than women even though they are likely to die younger. This can be explained by a combination of cultural norms and higher incidence of non-fatal but disabling diseases among women at higher ages; men, by contrast, are more often affected by fatal illness (see for instance Espelt et al., 2010; Sarkeala et al., 2011).

Differences in health status, and therefore in life expectancy, influence people's capacity to work beyond a certain age. Highly-educated, high-income individuals will often find it easier to keep working, especially given that high-skilled occupations are typically associated with lower physical strain. Low-skilled workers, on the other hand, may find it hard or even impossible to continue work, in particular in occupations that impose a high degree of physical strain.

Differences in life expectancy also fuel inequality in retirement. As higher-educated people can expect to live longer past retirement age, they accumulate greater pension wealth relative to low-educated retirees, who receive benefits over a shorter period of retirement. Recent estimates for OECD countries show that a three-year difference in life expectancy at retirement between high and low earners equates to a 13% difference in pension wealth, compounding inequality in the level of monthly benefits between the two groups (OECD, 2017a).

Therefore, raising the retirement age would on average hit low earners harder than high earners because the increment would represent a larger share of their remaining life expectancy. However, OECD (2017a) shows that this relative impact due to longevity differences is small. If the effective retirement age were to be increased by three years between 2015 and 2060, the pension wealth – i.e. total discounted pension payments taking into account the length of the retirement period, and therefore life expectancy – of low earners relative to that of high earners would fall by an additional cross-country average of 1.2% only.

Labour market exit ages fell sharply between 1970-2000, narrowing gaps with normal retirement ages

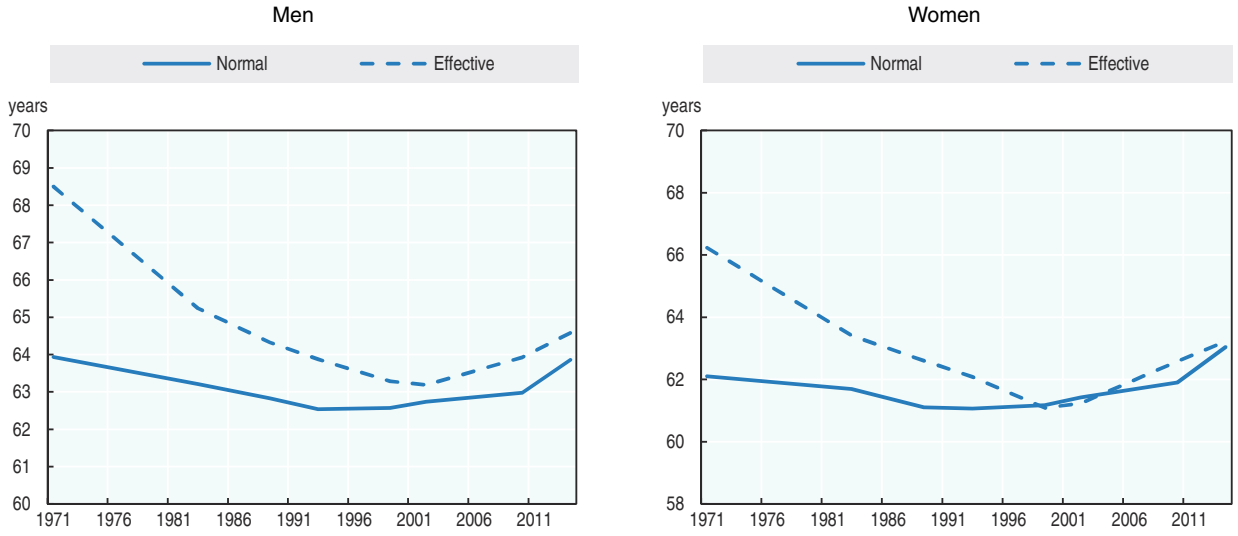
Increasing life expectancy combined with rapid declines in effective retirement ages until the early 2000s caused a sharp increase in the length of individuals' retirement over recent decades. In the early 1970s, men and women in OECD countries could expect to spend on average 10.8 years and 14.7 years in retirement, respectively; these numbers have risen to 18.1 years for men and 22.5 years for women today. This trend threatens the financial sustainability of pension systems and has triggered policy efforts to extend working lives.

The average effective retirement age in OECD countries, calculated as the average age at which individuals exit the labour market[6] dropped by around five years for both men and women between the 1970s and the early 2000s (Figure 2.6). The steep decline was partly due to the maturing of pension systems: the coverage and adequacy of these systems improved significantly in the second half of the 20th century, leaving many older workers with sufficient pension entitlements to stop working at earlier ages. At the same time, many OECD countries introduced early retirement schemes in the mid-1970s and 1980s in order to free up jobs for younger workers.

However, the desired effects of early retirement on youth employment did not materialise and pension spending surged, jeopardising the financial sustainability of pension systems (Banks et al., 2010, Herbertsson and Orszag, 2003, Jousten et al., 2008,

Figure 2.6. **The rise in effective retirement age lags behind the rise in the normal retirement age**

Average normal and effective retirement age in OECD countries by gender, 1970-2015



Note: The effective retirement age is measured here as the average labour market exit age (see indicator 7.8).

StatLink http://dx.doi.org/10.1787/888933633413

Kalwij et al., 2010). As a result early retirement routes were shut down and normal retirement ages were increased.[7] While effective retirement ages have recovered slightly recently, the average age of labour market exit remains well below its 1970 level (about four years below for men and three years for women).

Comparing the rules governing early retirement that existed in 2002, the reference year for the first edition of *Pensions at a Glance*, with those of today demonstrates the extent to which early retirement has been reduced. Since 2002, the early retirement age increased by around 14 months on average across OECD countries (Table 2.1), compared with an average increase of only eight months in the normal retirement age over the same period. The average gap between the early and normal retirement ages has thus narrowed by about six months due to the tightening of early-retirement rules.

Belgium increased the number of years of contribution required for an early pension from 30 in 2002 to 40 by 2016 (and 42 by 2019). The early retirement age was adjusted upwards most in Portugal, from age 55 in 2002 to the current level of 60 years. In Finland and Italy, it increased by about three years. In Japan, the Old-age Employees' Pension is currently available for individuals aged between 60 and 64 years but the eligibility age is gradually increasing to 65 by 2025 for men and 2030 for women.[8]

The effective retirement age has moved in the same direction as the normal retirement age, i.e. the age at which workers can access unreduced pension benefits, on average. The latter declined until the early 1990s for men, reaching a low of 62.5 years, compared with a high of 64 years in 1970 (Figure 2.6). For women the decline was smaller, from 62 years in 1970 to 61 years in the late 1980s. Since then normal retirement ages have increased steadily for both men and women but they only just reached the level for men seen in 1970, when life expectancy was much shorter and health conditions generally less favourable. For women, the normal retirement age exceeded its 1970 level (of 62 years) in 2010, with another one-year increase occurring by 2015. The relatively fast increase in retirement ages for women is a consequence of policies to equalise pension ages.

Table 2.1. **Earliest and normal (based on full careers) retirement ages in 2002 and 2016, men**

	2016		2002			2002		2016	
	Earliest	Normal	Earliest	Normal		Earliest	Normal	Earliest	Normal
Australia	55.0	65.0	55.0	65.0	Korea	55.0	60.0	57.0	61.0
Austria	61.5	65.0	62.0	65.0	Latvia	60.0	61.5	60.8	62.8
Belgium	60.0	65.0	62.0	65.0	Luxembourg		60.0		60.0
Canada	60.0	65.0	60.0	65.0	Mexico	60.0	65.0	60.0	65.0
Chile		65.0		65.0	Netherlands		65.0		65.5
Czech Republic	58.2	61.2	60.0	63.0	New Zealand		65.0		65.0
Denmark	60.0	65.0	60.0	65.0	Norway	62.0	67.0	62.0	67.0
Estonia	60.0	63.0	60.0	63.0	Poland		65.0		66.0
Finland	60.0	65.0	63.0	65.0	Portugal	55.0	65.0	60.0	66.2
France		60.0		61.6	Slovak Republic		60.0	60.0	62.0
Germany	63.0	65.0	63.0	65.0	Slovenia		60.0		60.0
Greece		58.0		62.0	Spain	61.0	65.0	61.0	65.0
Hungary		62.0		63.0	Sweden	60.0	65.0	61.0	65.0
Iceland	65.0	67.0	65.0	67.0	Switzerland		65.0	63.0	65.0
Ireland		66.0		66.0	Turkey		55.0		60.0
Israel		65.0		67.0	United Kingdom		65.0		65.0
Italy	60.0	65.0	62.8	66.6	United States	62.0	65.0	62.0	66.0
Japan	60.0	65.0	60.0	65.0	**OECD**	**61.0**	**63.6**	**61.9**	**64.3**

Note: Ages refer to labour market entry at age 20, with the normal retirement age being the earliest point to be eligible for all pension components without deduction. OECD average for earliest age uses the normal age for those countries where there is no early retirement option.

StatLink http://dx.doi.org/10.1787/888933633432

On average, the gap between the effective retirement age and the normal retirement age has almost disappeared for women and is now less than nine months for men. However, the OECD average for the effective retirement age is heavily influenced by several countries with very high labour market exit ages, such as Chile, Korea and Mexico. In Chile and Mexico, high levels of informal employment generate low pension entitlements, which might force people to stay in the labour market into old age. In Korea many older people are not eligible for adequate earnings-related pension benefits due to the relatively recent introduction of the pension system.[9] Removing these three countries from the sample eliminates the difference between the effective and normal retirement ages for men and leads to a slightly lower effective than normal retirement age for women (63.0 vs 63.6 years).

Based on existing legislation, the average gap between the normal and early retirement age in OECD countries will remain constant over the next decades, thanks to offsetting adjustments to normal and early retirement ages. Some reforms are still being phased in in some countries where the gap between early and normal retirement ages will shrink further. For example, the normal retirement age in Belgium has remained at age 65 for full-career workers entering the labour force at age 20 but the early retirement age increased from age 60 in 2002 to age 62 in 2016 and will increase further to 63 by 2018. Meanwhile, the United States has kept the early retirement age constant (at age 62) but adjusted the normal retirement age from 65 to 66; this will increase over time to 67.

Even if the average gap between them remains constant, the normal and early retirement ages are both expected to rise, thanks to the polices implemented by many countries to link the retirement age and life expectancy. Workers will need to work later in life to achieve a full pension, with early retirement ages increasing over the long term. Full

details of both future normal and early retirement ages for workers starting their careers today are shown in Table 2.2.

Table 2.2. **Future normal retirement ages based on career starting at age 20 in 2016**

		Scheme	Early age	Annual reduction	Normal	Increase
Australia		T	n.a.		**67**	
		DC	60			
Austria		DB (ER)	62	5.1%	**65**	4.2%
Belgium		DB (ER)	63		**65**	
		Min	n.a.		65	
Canada		Basic/T	n.a.		**65**	7.2% (Basic/T)
		DB (ER)	60	7.2%	65	8.4%
Chile		Basic/T	n.a.		**65**	
	Men	DC	Any age		65	
	Women	DC	Any age		60	
Czech Republic		DB	60	3.6-6%	**65**	6.0%
Denmark		Basic/T	n.a.		**74**	6.9%
		DC (ATP)	n.a.		74	
		DC (Occ)	69		74	
Estonia		Points	62	4.8%	**65**	10.8%
		DC	62			
Finland		Min	65	4.8%	**68**	4.8%
		DB	65		68	4.8%
France		DB	62	5.0%	63	5.0%
		Points	57	4.0-7.0%	**64**	
Germany		Points	63	3.6%	**65**	6.0%
Greece		DB	62		**62**	
Hungary	Men	DB	n.a.		**65**	6.0%
	Women	DB	Any with 40 years		**65**	6.0%
Iceland		Basic/T	n.a.		**67**	6.0%
		DB (Occ)	65	7.0%	67	8.0%
Ireland		Basic/T	n.a.		**68**	n.a.
Israel	Men	Basic/T	n.a.		**67**	5.0%
	Women	Basic/T	n.a.		**64**	5.0%
		DC			67	
Italy		NDC	67.4		**71.2**	
Japan		Basic/DB	60	6.0%	**65**	8.4%
Korea		DB	60	6.0%	**65**	7.2%
Latvia		NDC/DC	63		**65**	
		T	n.a.		65	
Luxembourg		DB	60		**60**	n.a.
Mexico		T	n.a.		**65**	
		DC	Any age/60	-	65	-
Netherlands		Basic	n.a.		**71**	n.a.
		DB (Occ)			65	
New Zealand		Basic	n.a.		**65**	
		DC	Flexible			
Norway		Min	67		**67**	
		NDC/DB	62			
		DC (Occ)	62			
Poland	Men	NDC/Min	n.a.		**65**	
	Women	NDC/Min	n.a.		**60**	
Portugal		DB	n.a.		**68**	
		Min	n.a.		68	
Slovak Republic	DB	66	6.5%	**68**	6.0%	
		DC	62		68	
Slovenia		DB	n.a.		**60**	4-12%
Spain		DB	n.a.		**65**	2%-4%
Sweden		GARP	n.a.		**65**	
		NDC/DC	61			
		DC (Occ)	55		65	
Switzerland	Men	DB	63	6.8%	**65**	5.2-6.3%
	Women	DB	62	6.35-7.1%	**64**	4.5-5%
Turkey	Men	DB	n.a.		**61**	
	Women	DB	n.a.		**59**	
United Kingdom		Basic	n.a.		**68**	5.8%
United States		DB	62	5.0/6.7%	**67**	8.0%
		T	n.a.		65	

Note: DB = defined benefit; DC = defined contribution; n.a. = early retirement or deferral of pension is not available; Occ = occupational; T = targeted. Where pension ages for men and women differ they are shown separately. Benefits automatically adjusted for early and late retirement in DC schemes. Data rounded to one decimal place. The reference retirement age used in the modelling has been bolded.
Source: See "Country Profiles" available at *http://oe.cd/pag*.

StatLink http://dx.doi.org/10.1787/888933633451

The OECD average normal retirement age for men will reach 66 years, and the early retirement age just under 64 years, which is close to today's average normal retirement age. If projected increases to life expectancy are fully reflected in changes in retirement ages, as planned in several countries, even the early retirement age in Denmark would is estimated to be 69 in around 50 years' time, which is higher than the normal retirement age in any OECD country today. Likewise, the normal retirement ages for individuals starting their careers today in Italy and the Netherlands would be above 70.

2.3. What options exist for flexible retirement?

In recent years, the debate around flexible retirement has focused on ways to combine work and pensions so that workers can retreat gradually from the labour market. Several countries have introduced programmes that seek to extend working lives by reducing

working hours at older ages and using pensions to compensate for at least part of the loss of earnings.

Another dimension of flexibility relates to the choice of when to retire. Most pension systems already offer this flexibility by allowing for early retirement under certain conditions, such as reaching a threshold age, having started to work at a very early age, or having contributed for a certain amount of time. Early retirement commonly refers to stopping work before the normal retirement age and accepting lower monthly benefits to reflect the longer period over which pensions are paid, a shorter career and possibly a penalty for claiming early. However, several countries offer the possibility of claiming a pension early whilst continuing in employment. Often, earnings restrictions apply, and these constraints are usually stricter than those applied for earnings after the normal retirement age. For instance in Belgium, those taking the early-retirement pension can earn up to 50% of average earnings before the pension is reduced. Many countries also allow workers to defer retirement, i.e. to work beyond the normal retirement age, usually in exchange for benefit increases to reflect the shorter period of retirement.

Finally, some countries allow workers to retire within a certain age range, for example between 62 and 67 years old. Officially, these pension systems do not have a normal pension age and workers can choose freely. However, in most cases there exists a fixed age at which certain components of the pension system, such as means-tested safety nets or universal basic pensions, become available. This becomes the normal retirement age de facto and thus acts as an anchor for people deciding when to stop working. An example is Sweden, where workers can claim earnings-related pension benefits from age 61 but do not receive the guaranteed pension before the age of 65. Prior to the reform in the late 1990s all components of the pension system could be claimed early, with the effective labour market exit age being around 64 for men and 62 for women. However, since the introduction of the guarantee pension the effective exit age has increased steadily, reaching 65.8 for men and 64.6 for women in 2016.

Early and deferred retirement options are rarely considered flexible retirement, but they work in a very similar way to a pension age corridor. Both leave room for individual choice, especially if the actuarial adjustments for early and late retirement take into account longer or shorter contribution and retirement periods, which makes the distinction between these forms of retirement age flexibility blurry. This is by design the case for defined contribution schemes (either funded or notional) in which benefits are automatically adjusted to the chosen retirement age.

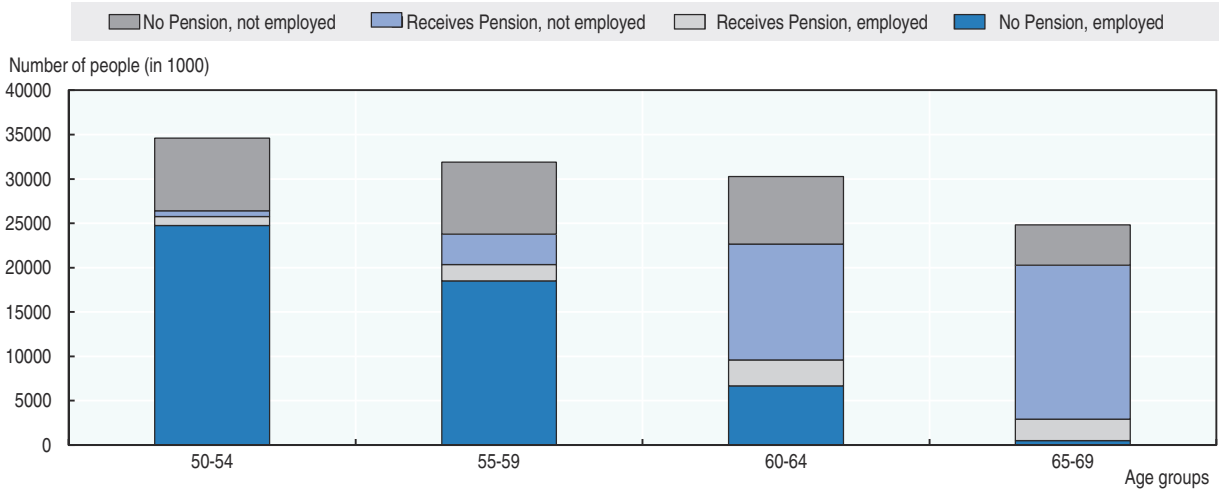
To better understand retirement patterns across OECD countries, a closer look at their pension rules is needed. The design of pension systems influences people's retirement decisions, also with respect to flexible retirement. The following sections will examine the options for three forms of flexible retirement on offer in OECD countries today and assess their impact on pensions.

Combining work and pensions

Combining work and pensions is possible in most OECD countries but the conditions for doing so vary. All countries allow pensioners who have fully retired to engage in paid work but earnings from this employment can affect pension payments in different ways. These will depend on the design of a pension system and its individual components, as well as tax rules and rules governing possible withdrawal of pensions once earnings from work reach a certain level.

Analysis of an ad-hoc module of the European Labour Force Survey reveals that very few people received pensions while working in 2012. Figure 2.7 shows that around 70% of individuals aged between 50 and 55 were in employment but not receiving a pension. Most others were neither employed nor claiming a pension.

Figure 2.7. **Employed, retired and other not employed persons aged 50-69, EU-28, 2012**



Source: Eurostat, EU-LFS.

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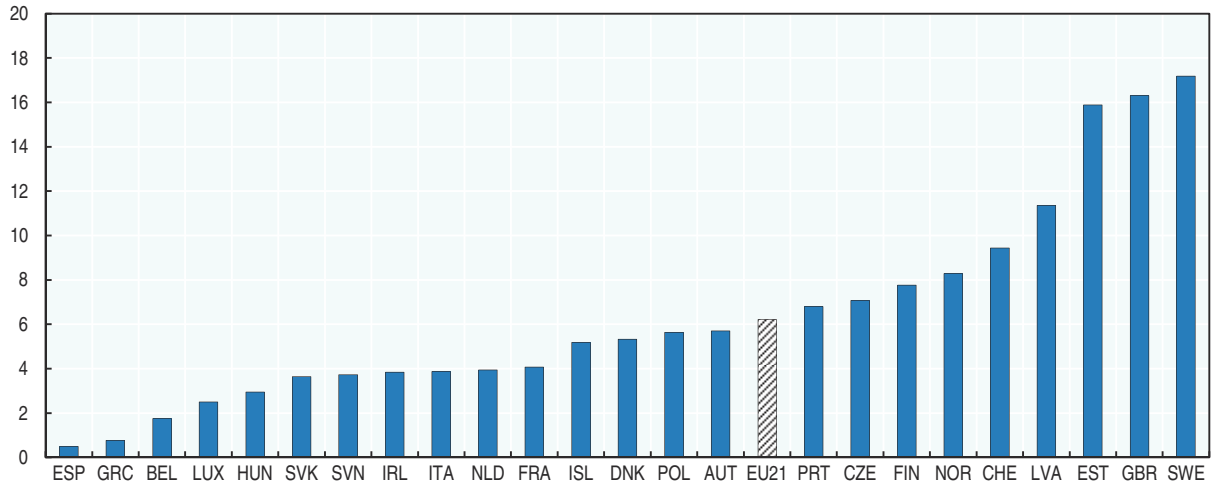
Between age 60-64 or 65-69 about 10% of individuals combine work and pensions. Moreover, as individuals age, the share of those in employment and not in receipt of a pension declines, with a notable drop for the 60-64 age group when early and normal retirement ages start to apply. Between age 60 and 64, 43% are not employed and receive a pension. Only 22% of individuals remain in employment not claiming a pension. By the time individuals reach the 65 to 69 age bracket, there are still 10% who receive pensions while working but only 2% of individuals continue in employment without claiming a pension, which means that pure pension deferral is not very common. The remaining individuals aged 65 to 69 are not working, with 70% claiming a pension and 18% not claiming a pension. As a result, people combining work and pensions represent 19% of pensioners aged 60-64 and 12.5% of those aged 65-69.

Over the past decade, many EU countries have made it easier for retirees to work (Eurofound, 2012). Yet, the share of older people combining work and pensions remains limited, even though countries differ in this regards (Figure 2.8). More than 15% of individuals aged 55-69 years combine work and pensions in Estonia, Sweden and the United Kingdom, but this figure drops to less than 3% in Belgium, Greece, Luxembourg and Spain. On average, men more often combine work and pensions than women (OECD, 2018).

The characteristics of individuals combining work and pensions differ from those of other retirees. In France, for example, in 2016 3.4% of pensioners also worked (DREES, 2017). The average age of those combining work and pensions is 65 against 72 for all pensioners. Individuals combining work and pension are also generally more educated and in better health than other pensioners, although this results partly from their belonging to younger generations (and therefore their younger age). Some 90% of them worked just before getting their pensions against two-thirds among pensioners as a whole. While three-

Figure 2.8. **Older workers combining work and pension, 2012**

Percentage of the population aged 55-69



Note: A person is on retirement when he/she receives an old-age pension (statutory scheme, occupational scheme, personal scheme or unknown scheme).

Source: Eurostat, EU-LFS, ad hoc module 2012 on transition from work to retirement.

StatLink http://dx.doi.org/10.1787/888933633489

quarters of older workers have a permanent employment contract, this is the case for only half of those combining work with pensions. Likewise, two-thirds of those combining work and pensions work part-time, against one-fifth of non-retired older workers in total (DREES, 2017). According to Eurofound (2012), working retirees are often younger and male. Retirees are more likely to work if they are highly educated, live in urban areas or have a mortgage.

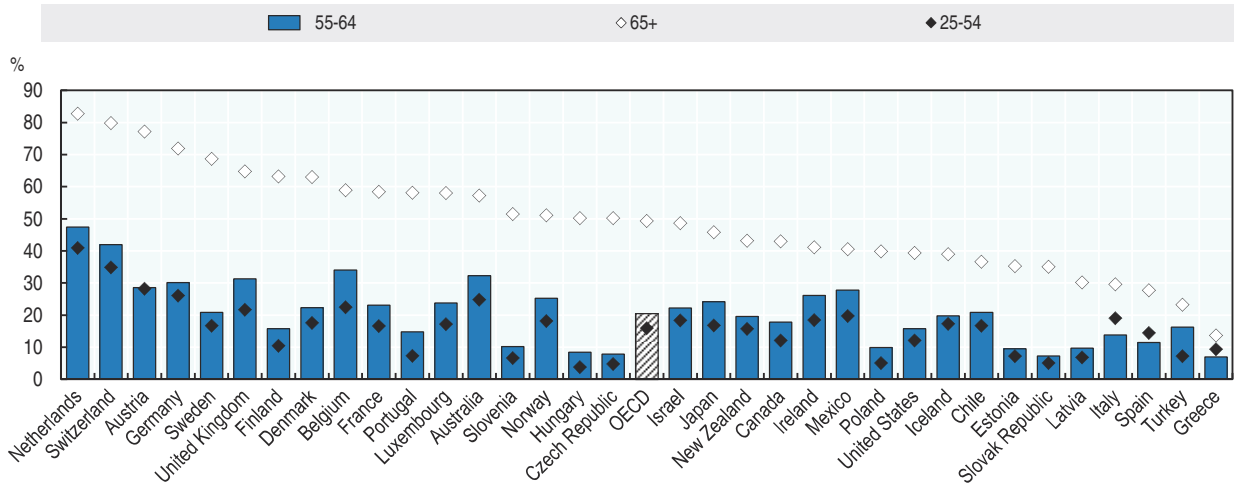
Retiring "normally" and continuing to work

Among the 65+ group in employment, part-time work is common (Figure 2.9). On average across OECD countries, about half of those employed who are older than 65 are employed part time against 21% for the 55-64 and 16% for the 25-54 cohorts. Over the last 15 years, these average shares have been stable but part-time employment among the 65+ cohort increased sharply in Austria, Chile, Luxembourg and Slovenia.[10] However, as a share of the entire 65+ population this is still a small fraction since employment rates at these ages are low.

The simplest form of combining work and pensions is to claim a full pension at the normal retirement age and to continue working partor full-time beyond this age. No OECD country requires workers to stop working entirely at the normal retirement age. However, some countries limit how much pensioners can earn (Table 2.3) while others, such as Poland, require that the initial contract is terminated.

Seven OECD countries apply limits to post-retirement earnings, above which pension benefits are reduced. Danish pensioners can earn up to two-thirds of average earnings before their earnings-related benefit is reduced, and on top of this the means-tested supplement is reduced for earnings above 15% of the average wage. In Greece, the monthly pension benefit of an individual aged over the retirement age who continues to work is reduced by 60% if earnings are above the social security threshold. In Israel, there is a withdrawal rate of 60% for each shekel of earned income above 57% of the average wage up

Figure 2.9. **Share of part-time employment in total employment in OECD countries by age groups in 2016**



Source: OECD LFS statistics.

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Table 2.3. **Rules for delaying retirement or working after pension age, 2016**

	Retirement ages		Annual bonus	Have to retire	Earnings limit		Retirement ages		Annual bonus	Have to retire	Earnings limit
	Normal men (women)	Max deferral age men (women)					Normal men (women)	Max deferral age men (women)			
Australia	65	-	-	N	Y	Korea	61	66	7.20%	N	Y
Austria	65 (60)		4.20%	N	N	Latvia	62.75			N	N
Belgium	65			N	N	Luxembourg	60	65		N	N
Canada	65	70	7.2%/8.4%	N	N	Mexico	65			N	N
Chile	65 (60)			N	N	Netherlands				N	N
Czech Republic	63 (62.3)		6%	N	N	New Zealand	65	-	-	N	N
Denmark	65	NRA+10	(a)	N	Y	Norway	67	75		N	N
Estonia	63		10.80%	N	N	Poland	65 (60)			N	N
Finland	65		4.8%*/7.2%	N	N	Portugal	66.2	70	4%-12%	N	N
France	61.6		5%	N	N	Slovak Republic	62		6%	N	N
Germany	65		6%	N	N	Slovenia	62		6%	N	N
Greece	62	-	-	N	Y	Spain	65		2%-4%	N	Y
Hungary	63		6%	N	N	Sweden	65			N	N
Iceland	67	70	6%/8%	N	N	Switzerland	65 (64)	70 (69)	5.2%-7.5%	N	N
Ireland	66	-	-	N	N	Turkey	60 (58)			N	N
Israel	67 (62)		5%	N	Y	United Kingdom	65		10.4%	N	N
Italy	66.6 (65.6)			N	N	United States	66	70	8%	N	N
Japan	65		8.40%	N	Y						

Note: Ages refer to labour market entry at age 20, with the normal retirement age being the earliest point to be eligible for all pension components without deduction.

(a) Denmark: The increment for deferring the pension for a year is the ratio of the period of deferral to average life expectancy at the time the pension is drawn. For example, if population projections show life expectancy for a 68 year old to be 17.1 years, the increment for deferring for a year from age 67 would be 1 / 17.1 = 5.8%.

* Finland: The deferral of 4.8% for the earnings-related component applies after age 68.

StatLink http://dx.doi.org/10.1787/888933633527

to age 70, after which there is no earnings limit. Likewise in Japan, for ages 65-69, when the total income exceed JPY 460 000 (108% of average earnings), pension benefits starts to be reduced.[11]

In Korea pensioners aged 61 or over will only receive 50% of the pension if they have earnings above the average of those insured. In Spain, the pensions of individuals who

continue to work after age 67 are reduced by 50%. In Australia, there is no restriction to combining work and pension receipt of the defined contribution Superannuation guarantee component. However, when eligible to the means-tested Age Pension, the only public pension benefit, then a reduction is likely. Although a small amount of earnings are exempted from the income test in the calculation of the Age Pension earnings exceeding 14% of average result in a pension reduction, if there is no income from other sources.[12] France does not have an earnings limit, but since 2015, working retirees having fully withdrawn their pension do not earn additional pension entitlements from the defined benefit scheme even though they have to pay pension contributions, which then act as a pure tax on continuing to work.

In most countries, pensioners have no restriction on working. For example, Austrian retirees who claim the full pension at normal retirement age and continue to work, pensions are recalculated each year to take account of the additional contributions made. In New Zealand, the flat-rate universal pension is available at age 65 without any option for early or late claim. Retirees can continue working and estimates suggest that almost one quarter of those aged 65 and over do so (HLFS, 2016).

Since 2010, the Czech Republic has no restriction on the combined receipt of an old-age pension and income from work. Pensioners can also opt for partial retirement and receive half of their pension. Other countries also allow partial withdrawal of pension benefits. In Sweden, workers can combine part-time work with a partial pension. Pensions can be withdrawn partially at 25%, 50% or 75% of the full pension. In addition, it is possible to combine work with receipt of the guarantee pension. In the Netherlands, partial retirement withdrawal schemes are widely offered by employers. Employees can work fewer hours per week and receive part of their pension. This opportunity is rarely taken, but tends to be focused on early partial retirement.[13]

Partial withdrawal of pensions might be beneficial for part-time workers as a way to smooth income and consumption at older ages. Receiving for instance 50% of pension benefits and 50% of labour income from a part-time job might be preferable for a transition period. This should of course boost the full pension received at full retirement (in an actuarial neutral way). For defined contribution schemes – funded or notional – this can be arranged in a straight-forward manner; part of the pension funds are annuitised at the time of partial retirement while the rest is only annuitised at full retirement. For defined benefit schemes, the calculations do not have to be that much different; part of the pension entitlements are taken at the retirement age, while the other part is deferred and adjusted in an actuarially neutral way.

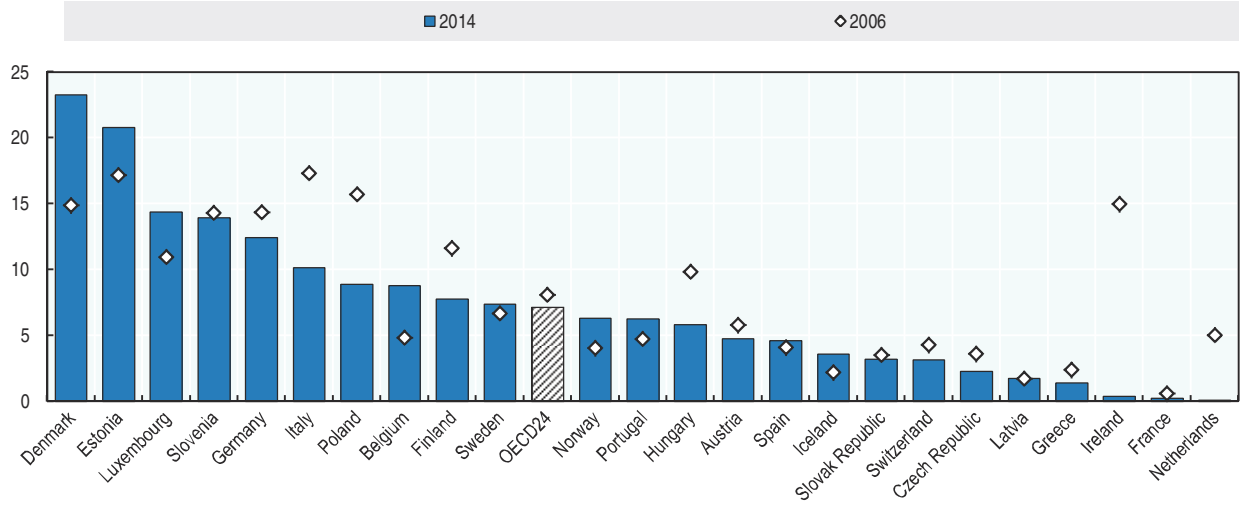
Retiring early and continuing to work

As discussed above, most countries have tightened early retirement programmes based on the definition used so far in this chapter. However, in order to investigate the relevance of early retirement schemes in individual countries survey data is required, which implies that the definition differs.[14] Analysis from Eurostat indicates that early retirement is still common in some countries (Figure 2.10). On average in 2014, in the 22 OECD countries reported in the figure, 7.7% of people receiving old-age pensions are in early retirement, down from 8.7% in 2006. The share ranged from 23.3% in Denmark to 0% in Turkey in 2014.[15] In Denmark, early-retirement programmes are channelled through voluntary unemployment insurance schemes and can therefore be considered early retirement for labour market reasons. However, the take-up rate of voluntary early-

retirement programmes is expected to decline as a consequence of reforms implemented since 2006 (OECD, 2015). According to the definition used here, early retirement decreased substantially in Ireland, Italy and Poland.

Figure 2.10. **Early retirement is still common in many countries**

Early retirement among persons who receive an old-age pension (%)



Source: Eurostat. Early retirement includes: anticipated retirement, early retirement due to reduced capacity to work, early retirement for labour market reasons.

StatLink http://dx.doi.org/10.1787/888933633546

In most countries, the early claim of pension entitlements is possible for only part of the pension benefit, typically the (defined contribution) earnings-related portion; flat-rate or safety-net benefits are only available at the normal retirement age, almost by definition. In many countries with defined contribution schemes, at least part of the pension can be taken as a lump sum.

In the United Kingdom, for example, early retirement with a lump sum is possible from the age of 55 for men, ten years prior to the normal retirement age when the basic components can be claimed. In Ireland, individuals can retire at age 50 with the defined contribution pension but the basic pension cannot be claimed before the age of 66. However, in these two countries, the defined contribution schemes, although applicable to a significant proportion of the population, are not mandatory and so are not included in the calculations below. In Australia, there are so-called Transition-To-Retirement Pensions (TRIPs) that let workers move from full-time to part-time work and complement their income with the pension.[16] In the Netherlands, combining work and partial pensions before the retirement age is often part of the same schemes that allow combining work and pensions after the retirement age. The earliest age differs by employers, but can be as early as 55. However, the basic pension is only available at the normal retirement age.

Eleven countries – beyond those with mandatory defined contribution schemes – allow combining work and early pension receipt (the rules for normal and early retirement ages are summarised in Table 2.4): Austria, Belgium, Canada, the Czech Republic, Finland, France, Germany, Greece, Japan, Norway and the United States.[17] If people make pension contributions for work while receiving an early-retirement benefit, pensions are either recalculated each year to reflect these new contributions, or once the pension is eventually claimed.

Table 2.4. **Early and normal (based on full careers) retirement ages for those retiring in 2016**

		Scheme	Early age	Able to combine work and early retirement	Normal
Australia		T	..		65
		DC	57		..
Austria	Men	DB (ER)	62.0	Y	65
	Women	DB (ER)	59.9		60
Belgium		DB (ER)	62	Y	65
		Min	..		65
Canada		Basic/T	..		65
		DB (ER)	60	Y	65
Chile		Basic/T	..		65
	Men	DC	Any age		65
	Women	DC	Any age		60
Czech Republic	Men	DB	60	Y	63
	Women	DB	60		62.3
Denmark		Basic/T	..		65
		DC (ATP)	..		65
		DC (Occ)	60		65
Estonia		Points	60		63
		DC	62		..
Finland		Min	63	Y	65
		DB	63		
France		DB	61.6	Y	61.6
		Points	56.6		61.6
Germany		Points	63	Y	65
Greece		DB	62	Y	62
Hungary	Men	DB	..		63
	Women	DB	Any with 40yrs		63
Iceland		Basic/T	..		67
		DB (Occ)	65		67
Ireland		Basic/T	..		66
Israel	Men	Basic/T	..		67
	Women	Basic/T	..		62
Italy	Men	NDC	62.8		66.6
	Women	NDC	61.8		65.6
Japan		Basic/DB	60	Y	65
Korea		DB	57		61
Latvia		NDC/DC	60.75		62.75
		T	..		67.75
Luxembourg		DB	60		60
Mexico		T	..		65
		DC	Any age/60		65
Netherlands		Basic	..		65.5
		DB (Occ)			65
New Zealand		Basic	..		65
Norway		Min	67	Y	67
		NDC/DB	62		67
Poland	Men	NDC/Min	..		66
	Women	NDC/Min	..		61
Portugal		DB	60		66.2
		Min	..		66.2
Slovak Republic	Men	DB	60		62
	Women	DB	60		62-58.25[1]
Slovenia	Men	DB	..		60
	Women	DB	..		59.75
Spain		DB	61		65
Sweden		Basic	..		65
		NDC/DC	61		..
Switzerland	Men	DB	63		65
	Women	DB	62		64
Turkey	Men	DB	..		60
	Women	DB	..		58
United Kingdom	Men	Basic (SP)	..		65
	Women	Basic (SP)	..		63
		T (PC)	..		63
United States		DB	62	Y	66
		T			65

Note: The normal retirement age is calculated assuming labour market entry at age 20. DB = defined benefit; DC = defined contribution; .. = early retirement or deferral of pension is not available; Occ = occupational; T = targeted. Where pension ages for men and women differ they are shown as Men/Women. – = benefits automatically adjusted for early and late retirement in DC schemes.

1. France: Combining partial work and early pension is possible from age 60. 2. Slovak Republic: For women with children the pension age is reduced dependent on the number of children.

Source: See "Country Profiles" at *http://oe.cd/pag*.

StatLink http://dx.doi.org/10.1787/888933633565

Limitations and eligibility criteria for combining work and receiving early pension vary widely across countries. In Austria, early retirees can only make up to 11% of average earnings before the early pension is fully withdrawn. In Belgium, by contrast, early retirees can earn up to 50% of average earnings before the pension is gradually reduced. In the Czech Republic, individuals can receive half of the pension whilst working, with the total accrual factor increasing by 1.5 percentage points for each six months of work. France has in place a gradual retirement programme, which applies both an earnings and hours condition: the number of hours worked can be between 40% and 80% of full-time work with the pension reduced proportionally, and the combined income from pension and work income cannot exceed the individual's last wage prior to early retirement. In Germany, for those with annual earnings above EUR 6 300 (13% of average wage), the full pension is reduced by 40% of the additional earnings. In Greece, early retirees can have a combined

pension and employment income of 40% of average earnings; thereafter pensions are reduced by 60% against employment income. Likewise in Japan, for ages 60-64, when the total income of monthly pension and standard remuneration exceed JPY 280 000 (two-thirds of average earnings), pension benefits start to be reduced. Further details of the rules that apply can be found in Annex 2.A1 in the annex.

Table 2.4 shows the different rules that govern early retirement in OECD countries in 2016 (this complements the summary presented in Table 2.1). For example, in Chile women can retire from the defined contribution scheme at age 60 but have to wait until age 65 for the means-tested element (if entitled to a low pension) to obtain their full pension. Likewise, individuals in Canada can retire with their mandatory earnings-related pension from the age of 60 (though with a reduction) but neither the basic nor means-tested pensions are available before the age of 65.

Given the variety of rules described above it is useful to examine in more detail, using OECD pension models, the impact of various flexibility options on pension benefits. Sections 2.3 and 2.4 show the consequences of late and early retirement on replacement rates, where there are more and fewer years of contribution, respectively. First, the next section examines the concept of "actuarial neutrality" to provide a benchmark to compare bonuses and penalties from longer or shorter contribution periods.

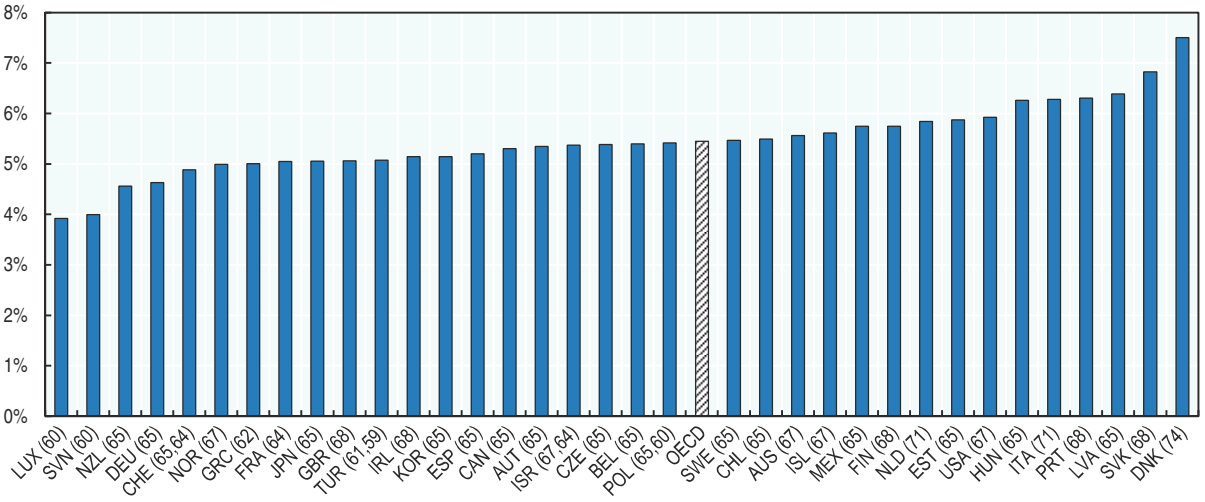
Actuarial neutrality

When individuals work past the retirement age they should receive a higher pension benefit compared to the benefit they would have received at the normal retirement age. Conversely, when retiring before the normal retirement age pensions should be lower. Actuarial neutrality is a central concept for the assessment of the size of this bonus or penalty and thus for the assessment of work incentives around retirement ages (see Annex 2.A1 for details). Actuarially neutral pension schemes ensure that at a given age (e.g. at retirement age) a worker is (actuarially) indifferent between retiring and working an extra year. A bonus on accumulated entitlements for deferring the receipt of pensions that is larger than implied by actuarial neutrality provides financial incentives to work longer but is costly for the pension provider. Reciprocally, a bonus that is lower than would be consistent with actuarial neutrality acts as a disincentive to continue working.

The actuarially neutral bonus depends on the retirement age, mortality rates, the discount rate and the indexation of pension in payments, but not on the other parameters used to compute pension benefits (see Annex 2.A1).[18] It is therefore unrelated to what pension systems actually deliver. On average across countries, actuarial neutrality implies a bonus of about 5.5% on past entitlements for each year of deferral (Figure 2.11).

Part of the cross-country variation relates directly to differences in the retirement age. For example, in both Luxembourg and Slovenia the long-term normal retirement age is 60, leading to a long period of pension receipt, and so a low actuarially neutral bonus or penalty, of about 4%, is needed to balance the system. Conversely, in Denmark the long-term retirement age is estimated to be 74 years as the increases in pension age are designed to result in an average of only 14.5 years in retirement, meaning that a much larger penalty or bonus, of about 7.5%, is required to ensure actuarial neutrality at that age. Similarly, for a given retirement age, a longer retirement period (i.e. longer remaining life expectancy) implies a lower neutral bonus: at age 65, it is 5.2% in Spain versus 6.4% in Latvia.

Figure 2.11. **Actuarially neutral annual bonus on past entitlements at the normal retirement age**



Note: Normal retirement ages are in parenthesis on the x-axis.
Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933633584

The level of the actuarially neutral bonus or penalty refers to past entitlements and thus does not depend on pension rules that are associated with contributions and used to determine the initial benefit levels. As discussed above, the only pension parameters that matter are the retirement age and the indexation of pensions in payment. By contrast, the impact of working an extra year or retiring one year earlier, relative to the baseline case, on pension benefits depends on the design of the pension systems.

Every year of extra (missing) contributions generally increases (decreases) pension entitlements, in the form of accumulated assets in a defined contribution scheme or additional rights in a defined benefit scheme. Some, but not all, countries offer additional bonuses (Table 2.3). As explained above, actuarial neutrality implies a bonus of about 5.5% on past entitlements on average across the OECD for each year of deferral. However, by working an additional year, higher accruals or increased referenced earnings used to compute the pension lead to a higher pension before any bonus is applied. Therefore, pensions might increase by much more than 5.5% per year of deferral even if the system is designed in an actuarially neutral way.

For example, in a simple defined benefit scheme with a retirement age of 65 and a full career from age 20 the benefit will increase by 1/45 = 2.2% based on the additional year of contribution before the bonus is applied. If actuarially neutral, this would lead to an overall increase of 7.7% (= 2.2%+5.5%) on average. However, not all defined benefit schemes accrue entitlements after the normal retirement age. In the United States, for example, deferring pension receipt by one year generates a bonus of 5% whether this year is spent working and contributing or not. In a defined contribution scheme – whether funded or not – pensions are automatically increased through both the accumulation phase (higher savings) and the payment phase (lower remaining life expectancy), resulting in higher annuities.

The effect of working longer on pension benefits

The maximum duration of pension deferral beyond the normal retirement age currently ranges from three years in Iceland to eight years or more in Denmark, France and

Norway (Table 2.3 above). Luxembourg has a deferral period of five years but, given the low retirement age, this means deferring only until age 65. Workers can work beyond these periods but their pension benefits are not increased further if they already have a full contribution history.

The impact of retiring later on pension benefits varies by component of the pension system. Basic pension systems, such as those in Ireland and New Zealand, pay the same benefit whether people work beyond the pension age or not. In such cases, the system is totally flexible after the retirement age, in the sense that it creates no incentive or disincentive to work longer or part-time. At the same time, however, there is no possibility to smooth pension payments, for example by claiming lower initial benefits and combining these with labour income, offset by higher benefits when fully retired.

In Canada, Denmark, Japan and the United Kingdom (amongst other countries), deferring pensions pays a 6-8% basic pension bonus for each year of deferral, in addition to higher earned entitlements when working; the bonus can be partially offset as income-tested benefit components are withdrawn, which is the case in Canada and Denmark.

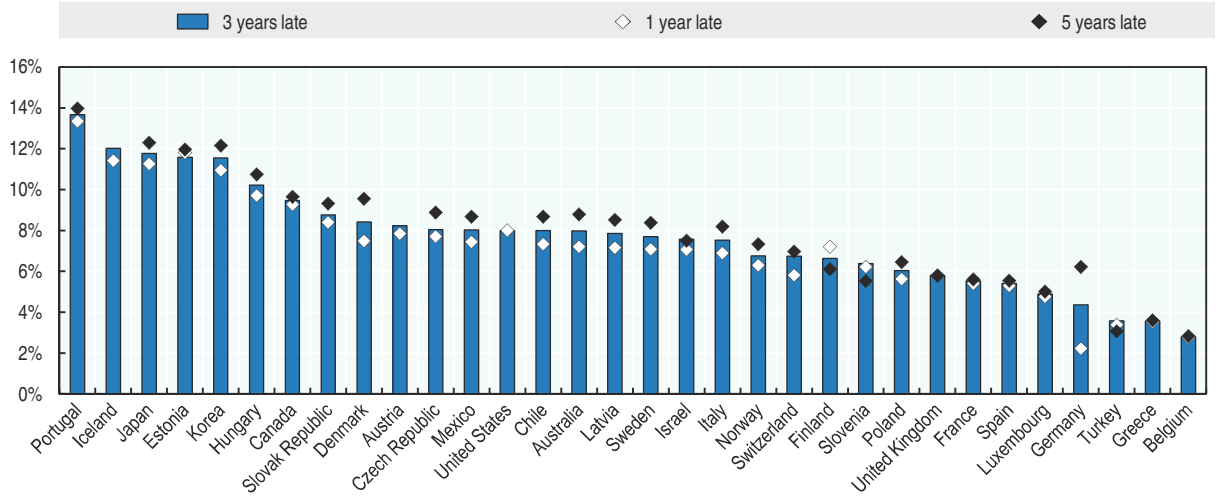
The effect of deferred retirement in earnings-related pension schemes differs across countries. In Portugal, pensions are increased by 4% for each year of deferral beyond the normal retirement age for people who have contribution careers of 15 to 24 years and by an annual 12% for careers of more than 40 years. In Switzerland, the first year of deferral increases the pension by 5.2% whilst the fifth year of deferral would increase it by 7.5%, giving a cumulative deferral of 31.5% for a five-year period. In funded or notional defined contribution components, the bonus is implicit in the calculation of the annuity: the monthly pension benefit is higher because the retirement period is shorter.

Deferring a pension increases pension levels in many countries significantly. Figure 2.12 shows the impact of deferring pensions and continuing to work for a full-career worker on annual benefits summed over all pension schemes.[19] In Australia, Chile, Italy, Latvia and Mexico, which all have defined contribution schemes – whether funded or not – the effect is close to 8%. Across OECD countries, the combined overall increase – from the deferral rate, additional entitlements and benefit indexation – averages about 7.5% per year of deferral, and depends only slightly on the length of the deferral.

Five countries record a large impact on pensions, with bonuses much larger than implied by actuarial neutrality: Estonia, Iceland, Japan, Korea and Portugal. The largest impact is evident in Portugal, as additional entitlements while working add to the bonus described above.[20] In Japan, both the basic and earnings-related components are increased by 8.4% for each year of deferral; adding in the effect of extra contributions and indexation of pension in payments results in an overall increase of around 11.5%. Korea offers a lower deferral rate of 7.2% but higher accrual rates, also resulting in an overall increase of 11%.[21] In these five countries, the large bonuses are potentially costly for the pension system.

In most countries, workers have therefore no financial disincentives to defer pensions once they become eligible to full pensions. There are a few exceptions, though; Belgium and Turkey have no bonus for late retirement, for example. Moreover, under the baseline full-career case from age 20, there is also no bonus in Greece until workers reach the age of 67. Deferring pensions (while working) generates a small increase in benefits in Germany at least for the first years.[22] In France the 5% bonus in the main scheme is activated not only by postponing retirement receipt, but also conditional on an individual continuing to contribute. Moreover, there is no additional entitlement beyond the bonus while in the

Figure 2.12. **Impact on annual total benefits when working and deferring pensions by up to five years after the normal retirement age, full-career average earners**



Note: Figures for three and five years late have been annualised, so a 6% increase shown in the chart means a total of 18% for three years and 30% for five years. It is not possible to defer the basic pensions in Ireland, the Netherlands or New Zealand so they are not included in the chart. In France, the one-year bonus applied to the occupational pension, between 10 and 30% depending on the length of deferral, has been spread across the entire retirement period based on the annuity factor.
Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933633603

occupational scheme a large bonus will apply from 2019 and be limited to one year of payments.

Whether the limited financial benefit from postponing retirement effectively generates disincentives to continue working depends on the extent of limitations on combining work and pensions. If there is no restriction, individuals who work beyond the retirement age can draw their pension and combine it flexibly with earnings.

The financial impact of early retirement

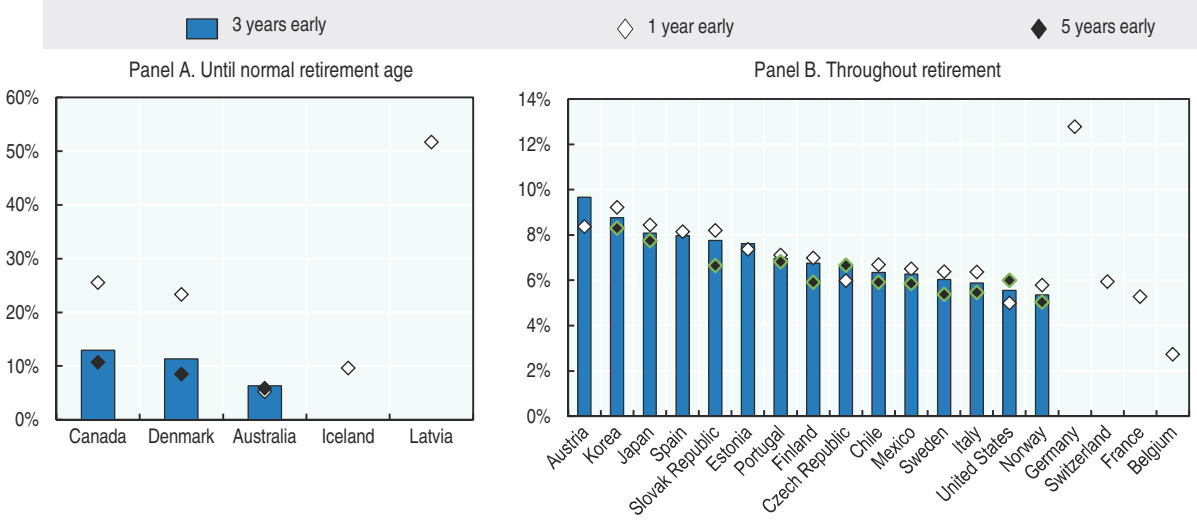
The impact of early retirement on future pension benefits differs between pension systems and between individual components within these systems. Usually, basic pensions are not available before the normal retirement age and old-age safety nets are never accessible at younger ages.

Some countries have no flexibility: early retirement is not possible under any circumstance in the mandatory pension systems of Hungary, Ireland, Israel, Luxembourg, the Netherlands, New Zealand, Poland, Turkey or the United Kingdom. While receiving an early pension is not possible in these countries, past entitlements are not affected by the decision to retire early. In addition, for the baseline case in *Pensions at a Glance*, early retirement is not relevant in Greece or Slovenia.[23] The analysis that follows excludes both sets of countries.

Not every component of the pension system is available early in Australia, Canada, Denmark and Iceland. In Australia, the Age Pension (the means-tested tax-financed component) will not be available until age 67 whereas the defined contribution component is available from age 60. Individuals claiming their pension for example at age 62 will have a 30% lower pension entitlement (or about 6% per missing year) of what they would have received if they had continued working until the normal retirement age.[24] The same

mechanism applies in the other three countries in this group; Figure 2.13 (Panel A) shows the impact.[25] Across this group, individuals' potential to retire flexibly is limited unless they can draw on savings or other assets, even though their pension entitlements are unaffected by the decision to retire early (i.e. there is no impact on pension wealth, which implies actuarial neutrality, see Annex 2.A1).

Figure 2.13. **Negative impact on annual total benefits when claiming pensions by up to five years early, full-career average earners**



Note: Figures for three and five years late have been annualised, so a 6% decrease shown in the chart means a total of 18% for three years and 30% for five years. In Latvia, shown in Panel A, there is a very strong disincentive to retire early; this is possible only two years before the retirement age, with the earnings-related pension reduced by 50% for up to two years.
Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933633622

Among other countries, the pension penalty for retiring before the retirement age tends to be similar for countries with similar pension systems (Figure 2.13, Panel B). In Chile and Mexico, which both have defined contribution schemes, the benefit decreases by slightly more than 7% per anticipation year for full-career average earners. The lower monthly pensions obtained upon retiring earlier are offset by the longer period of overall benefit receipt.[26]

Many countries have built financial disincentives to early retirement into their pension system.[27] This applies in particular to Austria and Korea, which have instituted rules that also act as strong barriers to flexible early retirement. In Korea, for example, the penalty for each year of early retirement is 6% for the earnings-related component on top of lower contributions. Germany is a special case: the early retirement reduction is calculated on the basis of the number of years prior to the (future) statutory retirement age of 67 while the normal retirement age is 65 based on the assumption in this analysis of a full career from age 20.[28] Belgium is the only country where early retirement generates a relatively small loss in benefits, though it is only possible to retire two years before the normal retirement age. This is because there is no penalty at all to retiring early, just one or two missing years of contribution.

While an individual choosing to retire early might face a significant financial penalty, the costs associated with early retirement for the pension provider are limited in most countries. In the 14 countries on the left of Panel B from Korea to Norway, the average impact of retiring three years earlier on benefits is a loss of 7% per year of anticipation, or

21% in total. In these countries and Australia (in Panel A), this allows older workers to choose the retirement age flexibly – with adjustments of benefits – several years before the normal retirement age without financially encouraging early retirement or overly penalising early retirees. In Austria, penalties are somewhat larger.

2.4. You can't always make the choices you wished for

Surveys confirm that workers would like greater flexibility in deciding when to retire, yet combining work and pensions is still uncommon. There are several possible explanations for this divergence between people's stated preferences and what they do in reality.

Surveys show that flexible retirement is popular in many countries

In the European Union, almost two-thirds of citizens say it appeals more to them to combine a part-time job and partial pension than to fully retire (Eurofound, 2016). However, enthusiasm for combining work and pensions differs across countries. In France only 15% of survey respondents aspired to continue working past retirement while 43% of Japanese respondents indicated they were considering to continue working after the official retirement age (Aegon Center for Longevity and Retirement, 2015). Meanwhile, 77% of employers in the United States say that many employees at their company plan to continue working either full-time or part-time after the retirement age (TCRS, 2016).

Employers' support for flexible retirement differs across countries. In the United States 81% of employers say their company is "supportive" of employees working past 65.[29] In Finland, where the statutory retirement age for the national pension is 65, 70% of employers and 86% of employees found the lower age limit of age 63 for flexible retirement acceptable in 2011 (Tuominen, 2013). However, 21% of the employers found the lower age limit too high versus 3% of the employees, suggesting that employers might use flexible retirement to phase out older workers. More generally, in Finland interviews showed that 19% of retired individuals would have liked to continue working, but 11% said that the employer would not have accepted that (see mandatory retirement in Section 4.2). Many employers stated that they are sceptical about the ability of people to work beyond 68. In the Netherlands, a recent survey found that the majority of employers in industry, services and the public sector were worried about the ability of workers with health problems to work longer (Van Dalen et al., 2017). At the same time, three-quarters of employers were in favour of a more flexible retirement age.

A crucial question for policy makers aiming to extend working lives in light of population ageing is how flexible retirement will affect people's labour market participation. Offering greater flexibility through the pension system might lead some workers to continue in employment while receiving retirement benefits but it might also entice those who work full-time and retire late at the moment to reduce their working hours. The impact of flexible retirement on total hours worked across the economy is therefore ambiguous; overall, recent flexibility reforms seem to have failed to increase the overall labour supply of older workers (Börsch-Supan et al., 2017).

A German survey (GfK, 2017) found that three quarters of respondents were not planning to retire later despite the introduction of flexible retirement (*Flexirentengesetz*). Only 6% indicated they planned to retire later in response to the new arrangements.[30] Among women and individuals with low educational attainment, this was even lower

(3.5% and 4%, respectively). Both groups typically have lower pension entitlements and are more likely to have interrupted careers. Late and/or phased retirement should be especially attractive for these groups in theory, but the survey suggests otherwise.

Allowing a gradual withdrawal of pension benefits while continuing to work might make flexible retirement more attractive. Based on an old study in the United States, 40% of survey respondents expressed an interest in phased retirement (Brown, 2005). About three-quarters of those interested indicated that phased retirement would encourage them to work past their normal retirement age. In the United Kingdom, 55% of survey respondents in the would support a system of partial early pensions in return for a lower pension when they retire in full (Berry, 2011). However, in the Netherlands, the majority of respondents still prefers full retirement at the retirement age over gradual retirement (Van Soest et al., 2006; Elsayed et al., 2015). But phased retirement is the second most frequently preferred option before late or early full retirement.

Wishes vs reality

While employers recognise that many of their staff want to retire more flexibly, few have programmes in place to support a gradual exit from employment. Only 39% of employers offer flexible time schedules in the United States (TCRS, 2016). In Europe, 78% of people over 55 cited a lack of opportunities to gradually retire by reducing hours worked as an important reason to stop working altogether (Eurobarometer, 2012). Using HRS data for the United States, Szinovacz and Davey (2005) find that nearly one third of older workers perceived their retirement as forced, linking it to health limitations, job displacement, and care obligations.

Combining work with receiving a partial pension in countries where this is permitted is also rare. In the United States such schemes have the potential to reach 2.5 million government employees. However, to date very few agencies chose to make it available to their employees (OECD, 2018). In the Netherlands, only 12 000 employees used phased retirement in 2014 even though it is widely available.[31]

In France, phased retirement (*Retraiteprogressive*, created in 1988) is possible at age 60 for those having at least 150 quarters of paid work (OECD, 2014). Although the number of pensioners working part-time more than doubled between 2015 and 2016, they still represent only a very small fraction of total pensioners (0.08% in 2016) in part due to the lack of information about the programme (DREES, 2015). Moreover, in 2016, 70% of the new beneficiaries had not reached the statutory retirement age of 61 years and 7 months (for people born in 1954) (Eurofound 2016).[32]

One reason why the reality of people's retirement decisions diverge from their preferences could relate to changing expectations. Prime age workers might not have a clear view of the possible benefits they can receive when getting closer to the official retirement age. For instance, employment decreases after age 62 in the United States, when workers can draw their public pensions; they also become eligible for Medicare when they turn 65. Given the relatively low unemployment rates in this age group, the drop in employment means that most people withdraw completely from the labour market. In Japan, workers who, in their 50s, expect they will receive a high pension benefit are more likely to be retired in their 60s than those expecting to receive low pension benefit (Usui et al. 2015). In addition, the drop in employment rates in OECD countries coincides with an age at which wages tend to decline (Blundell et al., 2016).[33] Lower wages from working part-time has an added

negative effect on pensions. Yet financial considerations cannot explain the limited use of flexible retirement in all OECD countries: in many, financial incentives to retire early or disincentives to continue to work after the retirement age are limited (Section 2.3). The sudden drop in employment and the limited use of flexible retirement seem to be influenced by other factors than financial incentives.

The fixed costs associated with employment, both for the employer and the employee (Piggott and Woodland, 2016), could also partially explain the limited use of part-time work to gradually retire.[34] An employer often has to provide a desk and office space and incur administrative and training costs for retaining staff while employees face time and/or monetary costs associated with commuting to work (which might become even more burdensome at older ages), work clothing and work lunches.

Mandatory retirement – allowing the employer to set an age at which an employee has to retire – is still in place in many OECD countries. The United Kingdom, Denmark and Poland are the only European OECD countries that abolished mandatory retirement ages while with four non-European countries, Australia, Canada, New Zealand and the United States (the latter with very limited exceptions) have also done so.[35] In Finland and Sweden, mandatory retirement still exists from age 68 and 67, respectively. Other examples include Iceland, France and Portugal from age 70, and Norway from age 72. This means that in many OECD countries the employer needs to create a new contract (or at least renew an existing contract) in order to continue working after the mandatory retirement age set by the employer. However, due to data limitations, it is unclear how often mandatory retirement ages prevent older workers from continuing to work when they want to.

Age limits on employment specified by some collective labour agreements remain a barrier to working at an older age and send out the signal that the ability to work diminishes at an arbitrarily set age. Suitability for employment should be based on choice, competence and health rather than age (OECD, 2017a). In 2013, the European Parliament recommended that European Union member states "put a ban on mandatory retirement when reaching the statutory retirement age, so as to enable people who can and wish to do so to choose to continue to work beyond the statutory retirement age or to gradually phase in their retirement" (European Parliament, 2013).

However, ending mandatory retirement altogether is certainly not without controversy (OECD, 2017a). Employers in particular often argue that their businesses could not run as efficiently without mandatory retirement. As it is difficult to measure the performance of workers, mandatory retirement can be used as a convenient mechanism for parting with less productive workers, especially in countries where employment protection rules are rigid.

Health at older ages declines on average; this deterioration might make work more difficult or sometimes even impossible for certain workers (e.g. Schofield et al., 2017). Older workers might exit the labour market before the statutory retirement age if they become eligible for disability benefits. Moreover, health status affects productivity, which might reduce demand for older workers if wages are not sufficiently flexible. But if wages are flexible, declining health might also lead to labour market exit through lower participation through a supply-side effect.

Finally, it could be that preferences change at older ages. The preference for leisure could increase for several reasons: because someone's spouse is retired (Warren, 2015), to spend more time with grandchildren, to travel or – related to health discussed above – to recover from sickness.

2.5. Conclusion

Rigidly set retirement ages might not be beneficial for society as a whole. Flexible retirement is therefore an important topic for policy makers. More flexible forms of retirement in which the timing and speed of labour market withdrawal can be adjusted might benefit those who want to work part-time at older ages, gradually withdraw their pension entitlements and better smooth their income from work and pensions. More generally, greater flexibility has the advantage of providing different options to better match individual preferences.

A pension system can be considered flexible if there are limited obstacles to combining work and pension receipt and if people can choose their age of retirement. Postponing retirement should be sufficiently rewarding to compensate for lost pension years while retiring a few years before the normal retirement age should not be overly penalised. However, flexibility should be conditional on ensuring the financial balance of the pension system, which implies that pension benefits should be actuarially adjusted in line with the flexible age of retirement.

Surveys indicate there is considerable interest in more flexible forms of retirement. However, reality differs from stated desires. In Europe about 10% of individuals aged 60-64 or 65-69 combine work and pensions which represents about one in five and one in eight pensioners, respectively. Moreover, about 50% of workers older than 65 work part-time on average in OECD countries: this share has been stable over the past 15 years. The share of part-time work after age 65 ranges from little over 10% in Greece to more than 80% in the Netherlands, where part-time work is more common at all ages.

Combining work and pensions after the official retirement age is possible in all OECD countries. However, disincentives are in place in several of them. Australia, Denmark, Greece, Israel, Japan, Korea and Spain apply earnings limits to the amount that people can earn while receiving pensions, beyond which pension benefits are reduced. These earnings limits mean that labour income is taxed more, which creates obstacles to retirees working while receiving their earned pension entitlements. Moreover, in France working retirees do not earn any additional pension entitlements on top of their full pensions even though they have to pay pension contributions. Removing such obstacles is important to make combining work and pensions more attractive. More generally, in order to efficiently promote more gradual forms of retirement, conditions to withdraw partial pensions should not depend on the amount of work and labour income after the normal retirement age.

While eleven countries allow combining work and early pension, beyond those with mandatory defined contribution schemes, there is limited flexibility in the provision of gradual retirement schedules by pension providers. Only in several countries including Australia, the Czech Republic, France and the Netherlands are early partial-retirement schemes widely available. For countries that currently have early retirement schemes, flexibility would be enhanced by greater opportunities to withdraw partial pensions, without being conditional on labour market outcome. In that case, pension providers should ideally offer different schedules for pension payments. For example, a share of pension entitlements could be withdrawn at an early retirement age and the remainder at the full retirement age. The amount of the early component should then be computed based on actuarial principles. This requires a high level of transparency in the communication of accrued entitlements by pension providers and of the different available schedules so that people have the information needed to assess the consequences of their decisions. Whether

pensioners would benefit from such a framework to combine work and pensions depends on their capacity to make well-informed choices to avoid jeopardising their final retirement incomes. Financial literacy plays an important role in that respect.

There could, however, be a conflict between different objectives, even if benefits are properly adjusted as a function of age or remaining life expectancy. On the one hand, partial withdrawals of pensions increase opportunities for older workers and allow them to smooth income at older ages. On the other, such flexible arrangements before the normal retirement age might actually provide incentives to work less at a still early stage. Indeed the evidence so far does not support the case that flexible retirement increases total hours worked.

Significant barriers to flexible retirement also exist outside the pension system, especially in the labour market or in cultural acceptance of part-time work, which limit people's freedom in deciding when and how to retire. Removing these obstacles requires correctly identifying their determinants and assessing whether addressing them would serve the general interest.

Pension entitlements increase in the vast majority of countries when retirement is postponed, and the financial disincentives to work after the normal retirement age are limited. In Estonia, Iceland, Japan, Korea and especially Portugal, the financial incentives to continue working after the retirement age are large for full-career workers and go beyond the increases that would be justified to compensate for the shorter retirement period. By generating higher benefits, this de facto provides great flexibility for workers, but also implies that working longer after a full career is costly for the pension provider in these countries. In Belgium, Greece and Turkey, by contrast, postponing the withdrawal of pensions only increases pension benefits by a small amount, making late retirement less attractive, while in Ireland, the Netherlands and New Zealand it is not possible to defer the basic pensions. If there is no restriction to combine work and pensions, as in all of these five countries except Greece, individuals who work beyond the retirement age can draw their pension and combine it flexibly with earnings.

Flexibility to retire fully before the normal retirement age is strongly restricted in more than half of OECD countries. There is no early retirement at all in the mandatory pension systems of Hungary, Ireland, Israel, Luxembourg, the Netherlands, New Zealand, Poland, Turkey or the United Kingdom. In another fifteen countries (Australia, Chile, the Czech Republic, Estonia, Finland, Italy, Japan, Korea, Mexico, Norway, Portugal, the Slovak Republic, Spain, Sweden and the United States) retiring a few years early is allowed and pension benefits are reduced in line what is justified by actuarial principles. Among countries where it is possible to draw benefits from all components of the pension system before the normal retirement age, this results in large pension reductions in Austria, Germany and Latvia; in Belgium, by contrast, the impact is small. In countries with individual defined contribution – funded or non-financial – accounts, pension benefits are automatically adjusted with age: flexibility to choose one's retirement age is thus a characteristic of the pension system. However, in practice that choice can be more or less constrained depending on the early age at which it is possible to start withdrawing pensions.

Chile, the Czech Republic, Estonia, Italy, Mexico, Norway, Portugal, the Slovak Republic and Sweden offer flexible retirement for the baseline case used in the OECD pension models (full career from age 20 until the age of full pension entitlement). These countries allow: combining work and pensions flexibly after the retirement age, in particular without any earnings limitations; reward postponing retirement; and, do not heavily penalise

retiring early. In Italy and the Slovak Republic, however, people entering the labour market today will only be offered flexibility at ages higher than 67 and 66 years, respectively. Moreover, providing flexibility through high bonuses and low penalties imposes cost on pension providers. From an actuarial standpoint, late retirement is very costly in Estonia and Portugal.

Even if pension rules are set such that benefits are adjusted with age in an actuarially neutral way to reflect a shorter or longer expected retirement period, some people might underestimate their future needs and retire too early with insufficient future pensions. Given short-sighted behaviours, there is a trade-off between greater autonomy left to individuals and income adequacy throughout retirement. Policies that de facto restrict early flexible retirement might therefore be needed. Hence, the early retirement age should be set high enough to make sure that individuals accumulate sufficient pension entitlements.

Notes

1. Using Gallup World Poll data they analyse France, Germany, Greece, Italy, Portugal, Spain, Sweden, Turkey, United States and the United Kingdom.
2. Surveys confirm a persistent perception of age discrimination (Eurobarometer, 2015; Australian Human Rights Commission, 2015; Ipsos Reid, 2012) and field experiments confirm this notion (Drydakis et al., 2017, Carlsson and Eriksson, 2017).
3. See Section 2.4.
4. See *OECD Education at a Glance Database*.
5. Data on healthy life years at different ages – equivalent to an indicator of disability-free life expectancy – are available from the statistical office of the European Union (Eurostat, 2016).
6. The average effective age of retirement is measured as the average age of exit from the labour force for workers aged 40 and over. In order to abstract from compositional effects in the age structure of the population, labour force withdrawals are estimated using changes in labour force participation rates rather than labour force levels. These changes are calculated for each (synthetic) cohort divided into five-year age groups. As it is not necessarily the case that individuals who exit the labour market automatically claim a pension this indicator will underestimate the effective retirement age, but can nevertheless act as a proxy.
7. However, early retirement is not the only pathway out of the labour market. Unemployment, disability and special programmes for specific sectors or jobs also allow for early exit. In recent year, rules concerning access to disability and unemployment schemes have been tightened, and sector-specific programmes have been phased out. Even though these programmes are important in explaining part of the rise in the effective retirement age, the rest of the chapter will focus on flexible choice for retirement rather than avenues into retirement for specific work-related reasons.
8. The eligibility age is gradually being raised from 60 to 65 years (between 2001 and 2013 for men and between 2006 and 2018 for women) for the flat-rate component and from 60 to 65 years (between 2013 and 2025 for men and between 2018 and 2030 for women) for the earning-related component.
9. In Chile for men the effective retirement age is 71.3 years while the normal retirement age is 65 (2016), for Korea it is 72.0 vs 61 and for Mexico it is 71.6 vs 65. Excluding these three countries leads to an average effective retirement age of 64.5, almost equal to the normal retirement age in 2016 (64.3). Also for women, these three countries have higher effective retirement ages. Chile 67.7 vs 60; Korea 72.2 vs 61 and Mexico 67.5 vs 65.
10. *Source*: OECD LFS statistics.
11. It is possible to combine pension benefits with employment after reaching the firm-specific retirement age. If pension recipients keep working after reaching the pensionable age, an earnings test is applied (*ZaishokuRoureiNenkin*) to reduce their pension benefits in earnings exceed certain amounts. Even though workers over 70 are not required to make pension contributions, the same scheme for ages 6569 will be applied for these workers.
12. This is in addition to the standard tax-free threshold and tax credits applying to all sources of income,

13. *http://cao.minszw.nl/pdf/175/2017/175_2017_13_238455.pdf*.

14. See the note Figure 2.10.

15. In Turkey no general early retirement scheme exists. Only workers in specific industries and people with disability can retire early but other workers cannot claim pensions before the eligibility ages (see "Country Profiles" at *http://oe.cd/pag*).

16. In the United States, employers are allowed to introduce phased retirement, allowing employees to shift from full-time to part-time work while receiving partial retirement benefits.

17. Germany and Austria also have rules that enable older workers to work part-time while maintaining their wage. Wages are subsidised in these cases as long as the employer hires a younger person in addition.

18. The overall rate decreases with the generosity of indexation of pensions in payments. This is because, for example, price indexation tends to lower the value of future benefits relative to wage indexation.

19. In Iceland and the United States, deferral is only possible for three years.

20. This full-career criterion is important as it ensures that the individual is not only eligible for the full pension but also for the maximum deferral rate. In Portugal, the 12% deferral rate implies that the pension would increase by 60% if deferred for five years; this would result in an average earner having a gross pension equivalent to nearly 120% of their previous earnings, though this would mean a career length in excess of 50 years.

21. Not each component of the pension system is increased at the same rate. For example the points pension in Estonia increases by 10.8% each year in addition to the contribution impact, whereas the DC scheme increases based on contributions, returns on pension assets and the pricing of annuities incorporating a lower remaining life expectancy, but still results in an annual increase of over 9% for each year of deferral. In Iceland, the occupational scheme increases by 8% (and the basic components by 6%) for every year of deferral.

22. In Germany the legislated future retirement age is 67, and this is the point after which the deferral bonus of 6% is applied. However, as this analysis assumes labour market entry at age 20 a full career is reached at age 65 after 45 years of contributions, meaning that the increase for the first two years of postponed retirement is only from the extra contribution.

23. Indeed, the OECD pension models assume in the baseline that workers enter the labour market at age 20 and work continuously until the normal retirement age (i.e. the age at which a full, unreduced benefit can be claimed). Under this assumption, early retirement does not apply in these countries as the normal and early-retirement ages coincide, i.e. there is no penalty at that age for any component of the mandatory pension system.

24. However, when these early retirees reach the normal retirement age they will become eligible for the means-tested component, the value of which is dependent on their assets at that time: the replacement rate at normal retirement age will be more closely aligned with that of full-career retirees.

25. In Canada and Denmark, retiring one year early would reduce the benefit by around 25%. In Iceland it is only reduced by 10%. The same would also be true for many other countries, when considering the means-tested components, but, as they are not applicable for full-career average earners, they are not relevant in this instance.

26. In Norway and Sweden there is no associated direct penalty with early retirement as the pension schemes are primarily NDC and DC and so the accumulated assets are simply smaller because of the reduced number of years of contribution. This would lead to lower annual benefit payments because of the longer duration of payment, with the benefit adjustment being close to neutrality.

27. That is, the penalty for retiring early is greater than implied by actuarial neutrality, i.e. than warranted by maintaining financial balances for pension providers over time.

28. Based on this assumption, individuals can retire with a full pension without penalty at age 65, as they will have a full 45-year career. However, when an individual retires one year earlier at age 64 they will only have 44 years of contributions and so will not be eligible for the full pension upon reaching age 65. For them, the statutory retirement age of 67 applies. This means that they are retiring three years before and so the total negative impact on benefit is thus 3.6 * 3 = 10.8% in addition to the missing year of contribution. The reduction for each year, if retirement is taken two years early, would be 5.5% as the additional penalty is only 3.6% plus one further missing year of contribution and one additional year of benefits.

29. 81% indicate they strongly or somewhat agree with the statement: "My company is supportive of its employees working past 65".

30. Others indicated they either planned to retire later anyway or that they did not know.

31. *Financieel Dagblad*, 15 May 2014, "Pensioen in deeltijd slaat maar niet aan", *https://fd.nl/frontpage/export/pro/pensioen_fd/25419/pensioen-in-deeltijd-slaat-maar-niet-aan*.

32. 60% of them were women.

33. Moreover, in the United States many firms provide defined benefit pensions – and did so especially in the past – and pension levels are sometimes a function of a worker's last salary. In such schemes a decline in working hours, and thus in earnings, can have a negative effect on pension benefits. Conversely, in the United Kingdom most DB pensions are calculated on a full-time equivalent basis. Moving from full-time to part-time at the end of their careers will not reduce worker's pension benefits in the United Kingdom unless the hourly wage decreases.

34. However, restrictions on part-time work should become less stringent in a more service oriented economy as the fixed cost of work drop compared to a more manufacturing focused economy (Börsch-Supan et al., 2017).

35. For instance in the United States, the 1986 prohibition on mandatory retirement contained exemptions for certain types of employment, including for firefighters, police officers, top executives and policy making officials who receive substantial retirement benefits, and tenured faculty members. Mandatory retirement for tenured faculty was permissible at the age of 70 until the exemption was repealed at the end of 1993. For more information, See: *www.eeoc.gov/eeoc/history/35th/thelaw/adea_amendments_1986.html*. Mandatory retirement also may exist where age is a "bona fide occupational qualification" for the position, which generally has been found in public safety positions such as pilots. Other federal laws also have imposed mandatory retirement ages for certain federal government employment, including for air traffic controllers, federal law enforcement positions, most foreign service officers, and military personnel.

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ANNEX 2.A1

Actuarial neutrality and financial incentives in pension systems

Actuarially neutral pension schemes ensure that at a given age (close to the retirement age) a worker is financially neutral ("indifferent") from an actuarial perspective between retiring and working an extra year. Actuarial neutrality is therefore a central concept to work incentives around retirement ages. There are two main interrelated but different definitions, capturing changes in pension benefits at the margin. According to the first (see e.g. Duval, 2003), the pension system is neutral if the cost in terms of foregone pensions and contributions paid for working an additional year is exactly offset by an increase in future benefits. According to the second (see e.g. Queisser and Whitehouse, 2006), the system is actuarially neutral if the present value of accrued pension benefits for working an additional year is the same as in the year before (meaning that the present value of the benefits increases only by the additional entitlements earned in the additional year). The main difference between the two definitions is that contributions paid and the benefits earned during the additional year are not considered in the second one.

Essentially, for simplification reasons, as the purpose here is mainly to provide reasonable orders of magnitude, this box uses the definition by Queisser and Whitehouse (2006). Overall, the present value of accrued pension benefits is best captured by the pension wealth, which is the most comprehensive indicator measuring cumulated pension payments (see indicator 4.11). It is defined at time or age t as the discounted flows of pension benefits, b_τ, expressed by:

$$PW_t = \sum_{\tau=t} \frac{b_\tau s_\tau^t}{(1+r)^{\tau-t}}$$

where s_τ^t is the probability of survival to age τ conditional on being alive at age t. Pension benefits are assumed to rise during retirement at an indexation rate u. Pension wealth is then equal to:

$$PW_t = b_t \sum_{\tau=t} \frac{(1+u)^{\tau-t} s_\tau^t}{(1+r)^{\tau-t}} \equiv b_t {}^* AF_t$$

In other words, cumulated pensions are the product of the initial pension benefit and the annuity factor (*AF*), which is equal to $AF_t = \sum_{\tau=t} \frac{(1+u)^{\tau-t} s_\tau^t}{(1+r)^{\tau-t}}$.

Actuarial neutrality states that the present value of *accrued* benefits is not modified by working an additional year. That is, the pension wealth PW_t obtained when retiring at time t

based on accrued benefits $b_t(1+u)^{\tau-t}$ for all $\tau \geq t$ is equal to the pension wealth from these entitlements when deferring retirement by one year, i.e. $\tilde{b}_{t+1}(1+u)^{\tau-t-1}$ for $\tau \geq t+1$. Obviously, the benefit received in that case $\tilde{b}_{t+1}$ should be greater than $b_{t+1} = b_t(1+u)$ obtained when retiring earlier to compensate for giving up the first pension benefit b_t. The main objective here is to estimate the annual bonus x that needs to be paid on pension benefits for postponing retirement by one year, i.e. $x_t = \frac{\tilde{b}_{t+1}}{b_{t+1}} - 1$.

The pension wealth obtained for deferring retirement by one year is equal, *conditional on surviving until* $t+1$, to $PW_{t+1} = \tilde{b}_{t+1} * AF_{t+1}$. However, for the decision of working one extra year at time t, the pension wealth has to be calculated at time t, which is denoted $PW^t_{t+1} = \frac{PW_{t+1} * s^t_{t+1}}{1+r}$. Actuarial neutrality imposes that $PW_t = PW^t_{t+1}$ which implies that:

$$b_t * AF_t = \frac{s^t_{t+1} * \tilde{b}_{t+1} * AF_{t+1}}{1+r} \Leftrightarrow \tilde{b}_{t+1} = b_t(1+u)\frac{1+r}{1+u}\frac{AF_t}{s^t_{t+1} * AF_{t+1}} \qquad \textit{(actuarial neutrality condition)}$$

Simple maths link the annuity factors across time as follows: $AF_t = AF_{t+1} * s^t_{t+1}\frac{1+u}{1+r} + 1$ by noting that $s^t_\tau = s^{t+1}_\tau * s^t_{t+1}$. The actuarial neutrality condition can then simply be rewritten as:

$$\tilde{b}_{t+1} = b_{t+1}\frac{AF_t}{AF_t - 1}$$

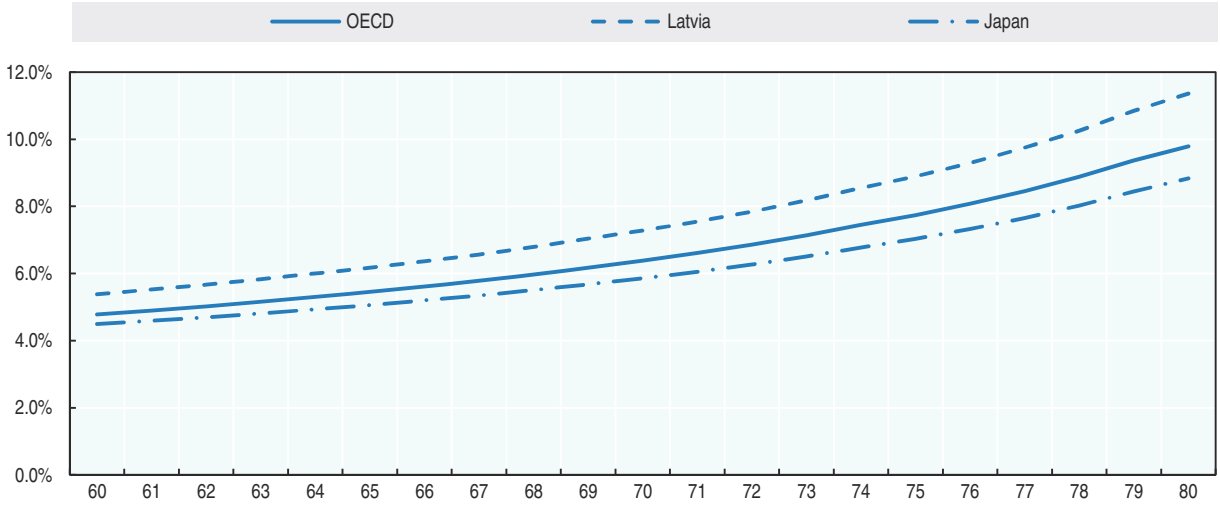
And the actuarially-neutral bonus rate for deferring retirement at age t by one year is $x_t = \frac{1}{AF_t - 1}$

What influences the bonus rate which ensures actuarial neutrality at a given age is therefore the parameters that determine the annuity factor. The main determinants are the set of mortality (or survival) rates from that age and therefore the retirement age is an important factor the discount rate and the indexation rate. If the indexation rate is equal to the discount rate, then the annuity factor at age t simplifies into remaining life expectancy at that age. The longer the remaining life expectancy (and more generally the lower the mortality rates) the lower the bonus rate consistent with actuarial neutrality as giving up pension payments for one year by deferring retirement can be offset over a longer period. Hence, because remaining life expectancy decreases with age, the bonus rate should increase with age to avoid work disincentives (or ensure actuarial neutrality). This is an important result.

Likewise, the lower the discount rate the higher the annuity factor and the lower the bonus rate as future payments have greater present values. For a given set of mortality rates and discount rate, the higher the indexation rate the lower the bonus rate because the foregone pension payments has then less relative value compared with the highly indexed future flows.

To illustrate the influence of age, Figure 2.A1.1 computes the bonus/penalty rate for delaying/anticipating retirement in an actuarial neutral way assuming both price indexation of pension benefits and a real discount rate of 2% consistent with the OECD pension model. The estimates are calculated for the average OECD country. For the cohort having entered the labour market at age 20 in 2016 (the 1996 birth cohort) projected (cohort) life expectancy is 86.7 years at birth, 87.3 at age 20, 89.8 at age 65 and 92.6 at age 80 on average. The average annual bonus/penalty rate for delaying/anticipating retirement by one year is 6.5% between age 65 and 75, increasing from 5.4% at age 65 to 7.7% at age 75.

Figure 2.A1.1. **Bonus (penalty) for deferring (anticipating) retirement by one year at a given age (x-axis) for OECD average, Japan (high LE) and Latvia (low LE)**



Note: Price indexation of pension benefits, mortality rates of 1996 birth cohorts.

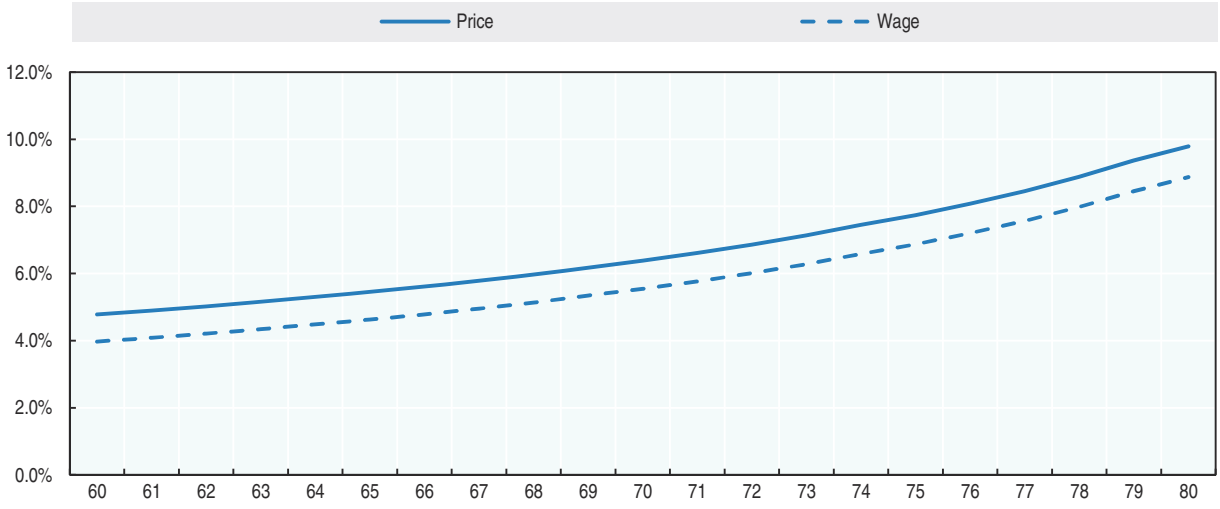
StatLink http://dx.doi.org/10.1787/888933633641

To show the impact of differences in mortality rates,Figure 2.A1.1 also shows the case of the two countries with the lowest and highest remaining life expectancy at age 65, Latvia and Japan, respectively. Compared with 6.5% between age 65 and 75 for the OECD average, the average actuarial neutral bonus/penalty rate is 5.9% for Japan and 7.4% for Latvia.

Finally, Figure 2.A1.2 shows the impact of the indexation rule by reporting the bonus/penalty rates ensuring neutrality for price and wage indexation. For wage indexation, the OECD pension model assumption is taken, i.e. an annual real-wage growth of 1.25%. Moving from price to wage indexation lowers the bonus rate by about 0.8 percentage point for the average country. With wage indexation, the neutral rate increases from 4.6% at age 65 to 6.9% at age 75.

It is important to remember that these estimations relate to accrued benefits and do not include additional entitlements generated by postponing retirement. For example, if one assumes that the accrual rate for pension benefits is 1% for each year of additional contribution – a reasonable number based on indicator 3.6 – then the annual bonuses above should be increased by 1 percentage point to infer the impact on pensions actually paid.

Figure 2.A1.2. **Bonus (penalty) for delaying (anticipating) retirement by one year at a given age (x-axis) depending on the indexation of pension benefits**



Note: OECD average mortality rates for the 1996 birth cohort.

StatLink http://dx.doi.org/10.1787/888933633660

ANNEX 2.A2

Main rules of pension penalties, bonuses and combining work and pensions

Table 2.A2.1. **Main rules of pension penalties, bonuses and combining work and pensions**

	Normal retirement age	Early retirement age	Penalty	Maximum retirement age	Bonus	Have to retire	Limit to combining work and pensions
Australia	65	57 for superannuation	-	-	-	N	The Age Pension is reduced if annual income from other sources exceeds a threshold known as the "income free area". This is adjusted annually in July. In 2016-17, the fortnightly income free areas were AUD 164 for a single pensioner and AUD 144 for a member of a couple (or AUD 292 for a couple combined). The Age Pension has a "Work Bonus" income test concession designed to encourage people of pension age to continue to work. It allows pensioners to earn up to AUD 250 a fortnight without it being assessed as income under the income test. Pensioners who earn less than AUD 250 in a fortnight can accrue the unused amount of fortnightly concession up to AUD 6 500 to offset future employment income. The combination of the Work Bonus and the pension income free area, allows a single pensioner with no other income to earn up to around AUD 10 764 each year without it affecting their pension. An assets test also applies. Almost 42% of all pensioners have their benefits reduced by the means test and are therefore on part-rate Age Pension. Within this group 57% have their pension reduced as a result of the income test and 43% as a result of the assets test. About 58% of pensioners are on the maximum rate Age Pension. In July 2016, the pension asset test thresholds for homeowners were AUD 209 000 for a single pensioner and AUD 296 500 for a couple combined. For non-homeowners the thresholds were AUD 360 500 for a single pensioner and AUD 448 000 for a couple combined. Assets above these amounts reduce the pension by AUD 1.50 per fortnight for every AUD 1 000 above the amount, for a single pensioner and for a couple combined. The family home is exempted from the asset test. The Australian Government announced changes to the assets tests in the 2015-16 Budget to rebalance the assets test parameters so as to improve the targeting and long-term sustainability of the pension system. Starting from 1 January 2017, the changes provided an increase in assets test thresholds. The new amount of assets (excluding the family home) pensioners can hold without any impact on their pension under the asset test is AUD 250 000 for a single home owner and AUD 375 000 for a home owner couple. For non-homeowners, the thresholds were increased to AUD 450 000 for a single non-home owner and AUD 575 000 for a non-home owner couple. The changes also increased the taper rate from AUD 1.50 to AUD 3.00 per fortnight, so that pension is reduced by AUD 3 per fortnight for every AUD 1000 over the assets test thresholds. The assets test exemption for the family home was not affected by the changes.

Table 2.A2.1. **Main rules of pension penalties, bonuses and combining work and pensions** *(cont.)*

	Normal retirement age	Early retirement age	Penalty	Maximum retirement age	Bonus	Have to retire	Limit to combining work and pensions
Austria	65 (60)	62	5.10%	68m/63w	4.20%	N	If earnings are above EUR 415.72 per month the pension is fully withdrawn for early retirement. Unlimited earnings after retirement age.
Belgium	65	62 (with 40 years)	-			N	For retirees aged 65+ or with a working career of at least 45 years (activity level of at least 1/3 FTE per year), there are no restrictions. For combining a retirement pension with earnings, there is a limitation applied for the earnings of retirees aged below 65 and with less than 45 years of career. For annual earnings under EUR 22 521 (single) or EUR 27 394 (with a dependent child), the pensions will not be reduced. Above these ceilings, the pension will be reduced by 35% if earnings are below 200% of the ceiling and the pension will fully be suspended if the earnings are more than 200% of the ceiling.
Canada	65	60 (CPP)	7.20%	70	7.2% (OAS), 8.4% (CPP)		CPP post-retirement benefit/QPP retirement pension supplement: Paid to pensioners who continue to work. For the CPP, contributions on pensionable employment income are mandatory for pensioners aged 60 to 64 and voluntary for those aged 65 to 70. Employer contributions are mandatory for employees aged 65 to 70 who chose to contribute. For the QPP, contributions are mandatory for pensioners of any age.
Chile	65 (60)	Any age (DC) if pension is at least 80% of the PMAS and 70% of average income over last 10 years.				N	
Czech Republic	63m/62.3w	60	3.6%(1st year), 4.8% (2nd), 6% (3rd+)		6%	N	It is possible to combine pension receipt while continuing to work (from 2010 granted pension (total accrual factor) has been increased by 0.4% for each 360 days of work while receiving full pension) and to receive half old-age pension. Combination of half old-age pension and work increases the total accrual factor by 1.5% for each 180 days of work.
Denmark	65	60 (DC occ)		NRA+10	Depends on life expectancy at the time pension is drawn.	N	The benefit may be reduced for annual earnings (from work) greater than DKK 316 000 for an unmarried pensioner. The supplement is reduced for total income greater than DKK 69 800 a year for an unmarried pensioner or DKK 140 000 a year for each person in a married couple.
Estonia	63	NRA-3	4.80%		10.80%	N	It is possible to combine work and pension receipt. In this case, contributions are again paid and the pension is recalculated annually. Persons receiving the early pension must cease all gainful activity.

Table 2.A2.1. **Main rules of pension penalties, bonuses and combining work and pensions** *(cont.)*

	Normal retirement age	Early retirement age	Penalty	Maximum retirement age	Bonus	Have to retire	Limit to combining work and pensions
Finland	65	63	4.8% (national old-age pension)		7.2% (national), 4.8% (ER after 68)	N	After taking the old-age pension, earnings accrue additional pension and the accrual rate is 1.5% per year until the age of 68
France	65.6 (61.6 with 41.6 years)	61.6 (ER), 56.6 (Occ)			5%	N	There are two different schemes allowing to combine work and retirement: Retraite progressive: Wage and pension can be combined starting from the legal age of retirement (62 for the generation born in 1955) or the age of 60 for those who have contributed at least 150 quarters. The insured reduces the number of working hours (40% to 80% of effective work) and receives the corresponding share of wage combined with a share of old-age pension. The insured keeps contributing and pensions are recalculated to reflect these new contributions. Cumul emploi-retraite: Someone who has retired can work and combine wage and pension without limit if the full rate retirement conditions are fulfilled (legal retirement age + number of years of contribution; or legal age without penalties). Wage and pension can be combined up to a certain limit if the insured does not meet those conditions. In both cases, working retirees do not earn additional pension entitlements.
Germany	65y5m (65 with 45 years)	63	3.60%		6%		For employees with annual earnings up to EUR 6 300, the full pension is paid; for those with annual earnings above EUR 6 300, the full pension is reduced by 40% of the additional earnings. After age 67 the combination of work and pensions isn't subject to an earnings test.
Greece	67 (62 with 40 years)	62	6% (For those whose right to the reduced amount of old age pension is established after 19/8/2015, there is an extra 10% reduction, until they reach the legal retirement age. After reaching the new standard retirement age, the extra reduction ceases.)	-	-	N	Pensioners younger than age 55 are not permitted to work and receive a pension at the same time. Pensioners aged 55 or over may work but their pension is earnings-tested. Cumulation with earnings from work is possible: For pensioners who undertake a job (as employed or self-employed) which is subject to compulsory insurance of EFKA, main and supplementary gross pensions are paid reduced by 60% during the employment period. Income test: Limit on overall net annual income (salaries and pensions) of EUR 6 824.45; total annual personal taxable income, EUR 7,961.87; and total annual family taxable income, EUR 12 389.65.
Hungary	63	Any age for women with 40 years			6%		Payment of pensions for people working in the public sector is suspended. For pensioners below statutory retirement age, the pension payment is suspended until the end of the year once the annual earnings reach 18 times the minimum wage.
Iceland	67	65		70			
Ireland	66	-	-	-	-	N	

Table 2.A2.1. **Main rules of pension penalties, bonuses and combining work and pensions** *(cont.)*

	Normal retirement age	Early retirement age	Penalty	Maximum retirement age	Bonus	Have to retire	Limit to combining work and pensions
Israel	67 (62)	-	-		5%		There are limits on the earnings from work for pensioners until age 70 for men. For women this age will increase gradually, reaching 70 years in 2020.
Italy	66.8 (65.8)	62.8 (61.8)	1%-age point			N	
Japan	65	60	6%		8.40%	N	For ages 60-64, when the total income of monthly pension and standard remuneration exceed JPY 280 000, pension benefits will start to be reduced depending on combined amount of monthly pension and standard remuneration. For ages over 65, when the total income exceeds JPY 460 000, pension benefits will start to be reduced depending on combined amount of monthly pension and standard remuneration. Workers over 70 are not required to pay contributions.
Korea	61	57	6%	NRA+5	7.20%	N	Pensioners above age 61 with earnings higher than the average insured will receive 50% of the pension and see the benefit increase by 10% according to the age increase. This is known as the "active old-age pension. Pensioners aged between 61 and 65 and that are working can chose either the "deferred pension" or the active old-age pension". Income and earnings test: If younger than age 66, taxable monthly income or earnings from gainful activity must not exceed KRW 2 105 482.
Latvia	62.75	NRA-2					
Luxembourg	65 (60 with 40 years)	60				N	The pension benefit has to be claimed at age of 65, unless qualifying conditions are not fulfilled at that date. However, it is possible to combine work and pension benefits receipt without reductions in the pension benefit
Mexico	65	60				N	
Netherlands	65.5						
New Zealand	65	-	-	-	-	N	
Norway	67	62		75		N	It is not possible to combine work and pension without an earnings test. Income test: The supplement is reduced by 50% of income in excess of an exemption amount.
Poland	65 (60)	-	-			N	It is possible to combine work and pension receipt. However, an employment contract has to be ended before the withdrawal of a full pension is possible. The pensioner can thereafter continue to work based on a new contract and receive the full pension. There are some restrictions that apply to the combination of earned income and pension income if a person is working and receiving a pension before reaching the statutory retirement age, or if a person is also a recipient of a disability pension and has been recognised as partly incapable of work. Income (including pension benefits) is subject to taxation.

Table 2.A2.1. **Main rules of pension penalties, bonuses and combining work and pensions** *(cont.)*

	Normal retirement age	Early retirement age	Penalty	Maximum retirement age	Bonus	Have to retire	Limit to combining work and pensions
Portugal	66.2	-	-	70	4%-12%		
Slovak Republic	62	NRA-2	6.50%		6%	N	For individuals that combine pension benefit withdrawal with work the pension benefit is recalculated automatically every year or upon request when the individual eventually retires, adding one half of the points earned during that period.
Slovenia	60 (59.75)		3.6%		4%		
	Normal retirement age	Early retirement age	Penalty	Maximum retirement age	Bonus	Have to retire	Limit to combining work and pensions
Spain	65y4m (65 years with 36y6m contributions)	NRA-2 with 35 years	6%-8%		2%-4%	N	Partial retirement is possible from age of 61 years and four months in 2016, with a new employee. In 2027, once the reform is completed, partial retirement will be possible at 63 with 36 years and six months contributed, or 65 years with more than 33 contributed years and less than 36 years and six months) or from 65 years and two months in 2014 (without substitution). Both the new and the partially retired employee will contribute fully to the pension system. Prior to the reform,the partially retired only contributed proportionally to the number of days effectively worked. Since March 2013, it is possible for individuals above the normal retirement age to combine retirement benefit receipt and work. However in these cases the amount of the pension benefit is reduced by the 50%.
Sweden	65	61 (earnings-related)				N	
Switzerland	65 (64)	63m/62w	6.80%	NRA+5	5.2%-31.5%		People do not continue to contribute after 65 under the public pension scheme
Turkey	60 (58)	-	-				
United Kingdom	65 (63)	-	-		5.80%		
United States	66	62	6.66% for 3 years then 5% for last two	70	8%	N	It is also possible to combine work and pension receipt subject to an earnings test. For beneficiaries who are receiving benefits in a year before the year they reach their NRA, the pension is reduced by 50% of earnings in excess of USD 15 720. Benefits are reduced by $1 for every $3 of earnings above USD 41 880 in the year the insured reaches the full retirement age. For workers who have reached their NRA, there is no benefit reduction based on earnings.

Chapter 3

Design of pension systems

The five indicators in this section look in detail at the design of national retirement income systems in OECD countries and other major economies. The first indicator sets out the taxonomy of the different kinds of retirement-income programmes found around the world. It uses this framework to describe the architecture of 43 countries' pension systems.

The next four indicators set out the parameters and rules of the pension systems. The description begins with second indicator covering basic, targeted and minimum income systems, showing the values and coverage of these systems. The third indicators look at the mandatory earnings-related pensions systems. It shows how benefits are determined in these schemes and the range of earnings that are covered. The fourth indicator presents the current retirement ages by pension scheme for an individual entering the labour market at age 20 and retiring in 2016. The last indicator looks at the future retirement ages for an individual entering the labour market at age 20 in 2016 and retiring in the future.

ARCHITECTURE OF NATIONAL PENSION SYSTEMS

Key results

Retirement-income regimes are diverse and often involve a number of different programmes. Classifying pension systems and different retirement-income schemes is consequently difficult. The taxonomy of pensions used here consists of two mandatory "tiers": an adequacy part and an earnings-related part. Voluntary provision, be it individual or employer-provided, makes up a third tier.

The framework, shown in the chart, is based on the role and objective of each part of the system. The first tier comprises programmes designed to ensure pensioners achieve some absolute, minimum standard of living. The second-tier, earnings-related components, are designed to achieve some target standard of living in retirement compared with that when working. Within these tiers, schemes are classified further by provider (public or private) and the way benefits are determined. *Pensions at a Glance* focuses mainly on these mandatory components although information is also provided on some voluntary, private schemes.

Using this framework, the architecture of national schemes is shown in the table. Programmes aimed to prevent poverty in old age – first-tier schemes – are provided by the public sector and are of three main types.

Basic pensions can take two different forms: a benefit paid to everyone irrespective of any contributions made, although beneficiaries might have to meet some residence criteria. In some countries residence-based benefits are potentially offset against other pension income; or a benefit paid solely on the basis of the number of years of contributions, i.e. independently of earnings. Some 18 OECD countries have a basic pension scheme or other provisions with a similar effect.

Minimum pensions can refer to either the minimum of a specific contributory scheme or of all schemes combined. They are found in 15 OECD countries. The value of entitlements takes account only of pension income: unlike means-tested schemes, it is not affected by income from savings, etc. Minimum pension credits in earnings-related second-tier schemes, such as those in Belgium and France, also have a redistributive effect and benefit workers with very low earnings since the pension credits are calculated as if the worker had earned pension credits at a higher level.

Social assistance plans pay a higher benefit to poorer pensioners and reduced benefits to better-off retirees. In these plans, the value of the benefit depends either on income from other sources or on both income and assets. All countries have general social safety-nets of this type. Rather than having every country marked in the table, only seven OECD countries are marked in this column; full-career workers with low earnings (30% of the average) would be entitled to resource-tested benefits in these countries.

Only Ireland and New Zealand in the OECD do not have mandatory, second-tier provision. In the other 33 countries, there are four kinds of scheme.

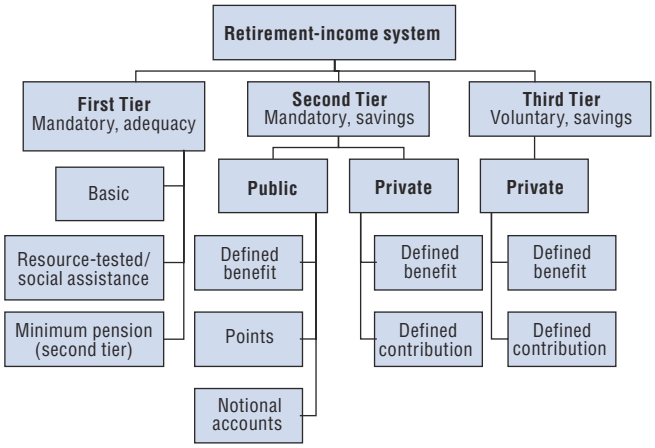
Defined benefit (DB) plans are provided by the public sector in 18 OECD countries. Private (occupational) schemes are mandatory or quasi-mandatory in three OECD countries (Iceland, the Netherlands and Switzerland). Retirement income depends on the number of years of contributions and individual earnings

There are ***points*** schemes in four OECD countries: French occupational plans (operated by the public sector) and the Estonian, German and Slovak public schemes. Workers earn pension points based on their earnings each year. At retirement, the sum of pension points is multiplied by a pension-point value to convert them into a regular pension payment.

Defined contribution (DC) plans are compulsory in ten OECD countries. In these schemes, contributions flow into an individual account. The accumulation of contributions and investment returns is usually converted into a pension-income stream at retirement. In Denmark and Sweden, there are quasi-mandatory, occupational DC schemes in addition to smaller compulsory plans.

There are ***notional-accounts*** schemes in five OECD countries (Italy, Latvia, Norway, Poland and Sweden). These record contributions in an individual account and apply a rate of return to the balances. The accounts are "notional" in that the balances exist only on the books of the managing institution. At retirement, the accumulated notional capital is converted into a stream of pension payments using a formula based on life expectancy. Since this is designed to mimic DC schemes, they are often called notional defined contribution plans (NDC).

3.1. Taxonomy: Different types of retirement-income provision



3.2. Structure of retirement-income provision

	Basic	Minimum	Social assistance	Public	Private
				Type	Type
OECD members					
Australia	✓				DC
Austria				DB	
Belgium		✓	✓	DB	
Canada	✓		✓	DB	
Chile	✓		✓		DC
Czech Republic	✓	✓		DB	
Denmark	✓		✓		DC
Estonia	✓			Points	DC
Finland	✓		✓	DB	
France		✓		DB+Points	
Germany				Points	
Greece	✓			DB	
Hungary		✓		DB	
Iceland	✓		✓		DB
Ireland	✓				
Israel	✓				DC
Italy		✓		NDC	
Japan	✓			DB	
Latvia		✓		NDC+DC	
Korea			✓	DB	
Luxembourg	✓	✓		DB	
Mexico		✓			DC
OECD members (cont.)					
Netherlands	✓				DB
New Zealand	✓				
Norway	✓			NDC	DC
Poland		✓		NDC	
Portugal		✓		DB	
Slovak Republic		✓		Points	DC
Slovenia		✓		DB	
Spain		✓		DB	
Sweden	✓			NDC	DC
Switzerland		✓		DB	DB
Turkey		✓		DB	
United Kingdom	✓			DB	
United States				DB	
Argentina	✓	✓		DB	
Brazil		✓		DB	
China		✓		NDC+DC	
India		✓		DB + DC	
Indonesia				DC	
Russian Federation	✓			Points	DC
Saudi Arabia		✓		DB	
South Africa	✓				

Note: DB = defined benefit; DC = defined contribution; NDC = notional accounts. In Iceland and Switzerland, the government sets contribution rates, minimum rates of return and the annuity rate at which the accumulation is converted into a pension for mandatory occupational plans. These schemes are therefore implicitly defined benefit.
Source: See "Country Profiles" available at *http://oe.cd/pag*.

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BASIC, TARGETED AND MINIMUM PENSIONS

Key results

Basic and minimum pensions along with social assistance are defined as the first layer of protection for the elderly within the pension system. They make up the first tier of the OECD's taxonomy of pension systems, which was set out in the previous indicator of the architecture of national pension schemes.

Basic pensions exist in 18 OECD countries and are worth 19.9% of average worker earnings on average. 27 OECD countries provide a social assistance benefit equivalent to 18.1% of average worker earnings. Furthermore, 14 OECD countries provide a minimum pension benefit, most often above the basic or social assistance level. For a full-career worker, the average minimum pension is 25.6% of average worker earnings.

About three out of ten older people receive some support from basic, minimum pensions or social assistance on average.

There are three main ways in which OECD countries might provide retirement incomes to meet a minimum standard of living in old age (Table 3.3). The left-hand part of the table shows the value of benefits provided under these different types of scheme. Values are presented in *absolute* terms – national currency units – to allow a direct link with the detailed information in the country profiles available at *http://oe.cd/pag*. They are also given in *relative* terms – as a percentage of economy-wide average earnings – to facilitate comparisons between countries. (See the indicator of "Average wage" in Chapter 6).

Benefit values are shown for a single person. In some cases – usually with minimum contributory pensions – each partner in a couple receives an individual entitlement. In other cases – especially for targeted schemes – the couple is treated as the unit of assessment and generally receives less than twice the entitlement of a single person.

The analysis of benefit values is complicated by the existence of multiple programmes in many countries. In some cases, benefits under these schemes are additive. In others, there is a degree of substitution between them. Basic and minimum pension values are therefore summarised in Figure 3.4. The dark bars show the overall value of the basic benefit. This can be seen as the absolute minimum, safety-net income based on either residence or contributions. The lighter bars show minimum contributory benefits. The total of both bars are the minimum for a worker contributing for each year from age 20 until the standard national pension age.

There are only five countries in the OECD that do not have either a basic or minimum pension within their system (Austria, Germany, Korea, the Slovak Republic and the United States). In the other 30 countries, basic benefits are present in 18 including cases where basic pensions are residency-tested, such as the Netherlands and New Zealand. In Canada, Denmark and Iceland amongst others, entitlements are a mix of basic and resource-tested benefits.

In 13 countries, there is a minimum pension, with only the Czech Republic and Luxembourg having both a basic and minimum. The value of these benefits varies between a low of 10% of average earnings in Hungary to 41% in Turkey, with an average of 25% across the 13 countries.

Coverage

The percentage of over-65s receiving first-tier benefits is shown in the final two columns of the table and the right-hand chart below (Figure 3.4). Data are presented just for non-contributory safety-net benefits (not including the pure residency based basic pensions with no income-test e.g. New Zealand) and contributory minimum pensions. The importance of these benefits varies enormously. In Denmark 81% receive at least a partial payment from the safety-net. In Australia, 76% receive an element of the basic pension. At the other end of the spectrum, 3% or fewer of pensioners receive safety-net benefits in Hungary, Japan, Luxembourg, Portugal and the Slovak Republic.

Minimum pensions are received by nearly 50% of the over-65s in France and around 40% in Portugal. Levels are around 30% in Belgium, Italy, Luxembourg and Spain, but account for fewer than 1% of the over-65s in Hungary and only 2% in Slovenia.

3.3. Basic, targeted and minimum pensions, 2016

	Relative benefit value (% of AW earnings)			Absolute value (units of national currency per year)			Recipients, 2016 (% of over 65s receiving)	
	Basic	Minimum	Social assistance	Basic	Minimum	Social assistance	Safety-net	Minimum
Australia	27.6	x	x	22 677	x	x	76	x
Austria	x	x	27.8	x	x	12 359	10	x
Belgium	x	30.1	27.1	x	14 025	12 631	7	31
Canada	13.5	x	19.2	6 879	x	9 803	33	x
Chile	14.0	x	x	1 122 516	x	x	60	x
Czech Republic	8.9	11.7	12.4	29 280	38 520	40 920	..	..
Denmark	17.6	x	18.6	72 756	x	76 788	81	x
Estonia	14.7	x	14.7	2 009	x	2 009	6	x
Finland	17.4	x	21.0	7 612	x	9 202	40.6	x
France	x	21.7	25.3	x	8 256	9 610	4	49
Germany	x	x	20.1	x	x	9 588	3.1	x
Greece	23.0	x	x	4 608	x	x	19	x
Hungary	x	10.3	8.3	x	342 000	273 600	0.39	0.61
Iceland	5.7	x	17.9	478 344	x	1 509 516	..	x
Ireland	34.1	x	32.4	12 132	x	11 544	17	x
Israel	12.9	x	23.5	18 368	x	33 426	25	x
Italy	x	21.3	19.0	x	6 525	5 825	5	32
Japan	15.3	x	19.0	780 100	x	970 380	3	x
Korea	x	x	5.5	x	x	2 400 000	67	x
Latvia	x	x	7.6			768		
Luxembourg	9.8	36.7	28.8	5 496	20 652	16 176	1	29
Mexico	x	29.4	6.2	x	33 180	6 960	60	..
Netherlands	26.3	x	x	13 352	x	x	x	x
New Zealand	40.0	x	x	23 058	x	x	x	x
Norway	32.5	x	x	183 480	x	x	18	x
Poland	x	22.2	15.2	x	10 591	7 248	12	..
Portugal	x	30.4	17.6	x	5 328	3 079	2	38
Slovak Republic	x	40.7	19.8	x	4 446	2 166	1	7
Slovenia	x	13.2	17.4	x	2 418	3 183	17	2
Spain	x	33.3	19.3	x	8 905	5 151	6	25
Sweden	22.3	x	x	94 359	x	x	35	x
Switzerland	x	16.5	22.6	x	14 100	19 290	12	..
Turkey	x	41.2	7.1	x	15 181	2 607	22	
United Kingdom	22.2	x	x	8 122	x	x	14	x
United States	x	x	16.7	x	x	8 796	4	x

Note: .. = Data are not available. x = Not applicable. Recipients' data is 2012 for Estonia, France (Safety-net), Greece, Ireland, Israel, Italy, Korea, Luxembourg, Poland, Slovenia and Turkey.

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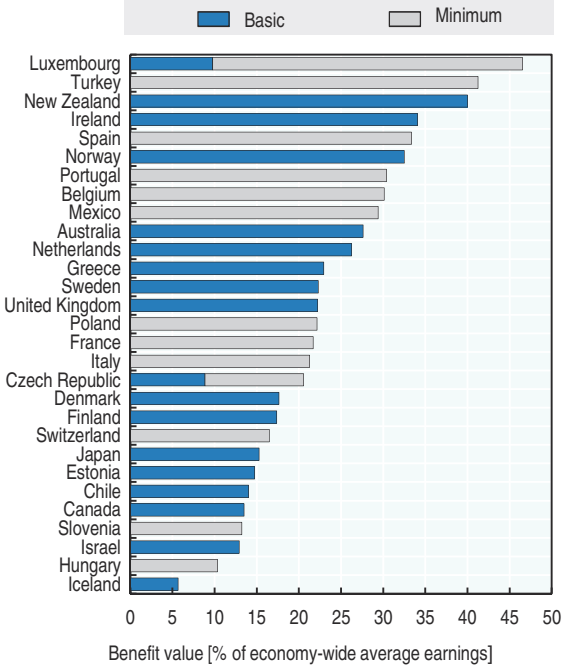
3.4. Value of basic and minimum pensions

Percentage of economy-wide average earnings



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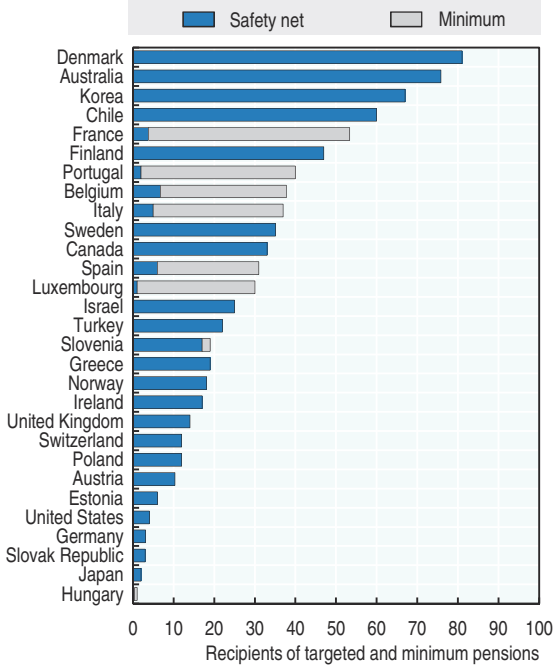
3.5. Recipients of safety-nets and minimum pensions

Percentage of individuals 65 and over



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MANDATORY EARNINGS-RELATED PENSIONS

Key results

The second-tier of the OECD's taxonomy of retirement-income provision comprises mandatory earnings-related pensions. Key parameters and rules of these schemes determine the value of entitlements, including the long-term effect of pension reforms that have already been legislated.

Earnings-related schemes can be of four different types: defined benefit (DB), points, notional defined contribution (NDC), or defined contribution (DC). The ***accrual rate*** shows the rate at which benefit entitlements build up for each year of coverage. The accrual rate is expressed as a percentage of the earnings that are "covered" by the pension scheme.

For points systems, the effective accrual rate is calculated as the ratio of the cost of a pension point to the pension-point value. In notional-accounts schemes, the effective accrual rate is calculated in a similar way; it depends on the contribution rate, notional interest rate and annuity factors.

In one-third of countries the accrual rate is constant within their DB or points systems. In the other countries with similar schemes, the benefit earned for each year of coverage varies, either with the level of earnings, age or years of contributions.

Among the seven cases where accrual rates vary with earnings, the public schemes of the Czech Republic, Portugal, Switzerland and the United States are "progressive": they pay higher replacement rates to lower earners. The occupational plans of France and Sweden, in contrast to the public scheme's redistribution, pay a higher replacement rate to high earners on their pay above the ceiling of the public plan. In the occupational plan in Switzerland accrual rates increase with age.

Accrual rates vary with service in three countries. In Luxembourg, they increase with a longer contribution history. Hungary and Spain do the reverse: the highest accruals for the first few years of coverage and lower later on.

Earnings measures used to calculate benefits also differ. Some 21 OECD countries use lifetime earnings to calculate benefits and in Canada and the United States, the great majority of careers (3435 years) are used. Spain uses the final 25 years, while public benefits in France and all benefits in Slovenia are based on respectively, the best 25 years and 24 years of earnings.

Closely linked with the earnings measure is ***valorisation***, whereby past earnings are adjusted to take account of changes in "living standards" between the time pension rights accrued and the time they are claimed (sometimes called pre-retirement indexation). The uprating of the pension-point value and the notional interest rate in points and notional-accounts systems, respectively, are the exact corollaries of valorisation in DB plans. The most common practice is to revalue earlier years' pay with the growth of average earnings. Belgium, France, Greece and Spain, revalue earnings only with price inflation and 25 years enter the benefit formula in the French and Spanish defined-benefit scheme compared with lifetime average in Belgium and the French occupational plans. Estonia, Finland and Portugal revalue earlier years' earnings to a mix of price and wage inflation and for Turkey it is a mix of price inflation and GDP growth.

One key parameter for defined contribution (DC) plans is the proportion of earnings that must be paid into the individual account, as this is directly linked to size of the pension pot at retirement. The average ***contribution rate*** for the 11 countries shown, including quasi-mandatory DC occupational schemes in Denmark and Sweden, is 6.9%. A number of countries have large voluntary DC schemes, as shown in indicator 4.4, but they are not included here.

Most countries set a limit on the earnings used to calculate both contribution liabilities and pension benefits. The average ***ceiling*** on public pensions for 20 countries is 224% of average economy-wide earnings, excluding four countries with no ceiling on public pensions. Ceilings are typically higher for mandatory private pensions.

Indexation refers to the uprating of pensions in payment. Price indexation is most common, but six countries uprate benefits with a mix of inflation and wage growth. A further two have a combination of prices and GDP, with another two increasing by wages with a set deduction. Some countries have progressive indexation, giving larger increases to low pensions.

3.6. Future parameters and rules of mandatory earnings-related pensions

	DB, Points or NDC schemes					DC schemes	Ceilings on pensionable earnings (% of average earnings)	
	Type	Accrual rate (%)	Earnings measure	Valorisation	Indexation	Contribution rate (%)	Public	Private
Australia	None					9.5-12		248
Austria	DB	1.78	28-40	w [1]	d		153	
Belgium	DB	1.33	L	p	p		117	
Canada	DB	0.64	L(83%b)	w	p [c]		108	
Chile	None					10.0		294
Czech Republic	DB	1.5-1.02	L	w	50w/50p		None	
Denmark	None					12 [2]		
Estonia	Points	1.0	L	50w/50p	80w/20p	6.0	None	None
Finland	DB	1.5	L	80w/20p	20w/80p		None	
France	DB/points	1.12	b25/L	p/p	p/p		101/304 [3]	
Germany	Points	1.00	L	w [c]	w [c]		156	
Greece	DB	0.8-1.5	L	p	50p/50GDP		350 [4]	
Hungary	DB	1.0-2.87	L	w	p			
Iceland	DB	1.40	L	fr	p			None
Ireland	None							
Israel	None					15.0		457
Italy	NDC	1.46	L	GDP	p [5]		327	
Japan	DB	0.55	L	w	w/p [6]		234	
Korea	DB	1.00	L	w	p		119	
Latvia	NDC		L	w	p+50%GDP	6.0	478	
Luxembourg	DB	1.825 [y]	L	w	p/w		205	
Mexico	None					6.5		591
Netherlands	DB	1.85	L	w [c]	w [c]			None
New Zealand	None							
Norway	NDC	0.94	L	w	w-0.75	2.0	115	
Poland	NDC	0.91	L	w [7]	p [7]	2.92	250	
Portugal	DB	2.3-2 [w]	L	25w/75p	p/GDP [8]		None	
Slovak Republic	Points	1.25	L	w	50w/50p	6.0	700	
Slovenia	DB	0.96	B24	w (d)	w		205	
Spain	DB	1.82 [y]	f25	p	0.25% to p+0.5%		164	
Sweden	NDC	0.95 [w]	L	w	w-1.6 [c]	2.5 +4.5 [9]	105	113/None
Switzerland	DB	[w/a]	L	fr	50w/50p		99	99
Turkey	DB	1.68[w]	L	p+30%GDP	p		349	
United Kingdom	None							
United States	DB	0.75[w]	b35	w [10]	p		226	

Note: Parameters are for 2016 but include all legislated changes that take effect in the future: for example, some countries are extending the period of earnings covered for calculating benefits. Empty cells indicate that the parameter is not relevant. [a] = Varies with age; [b] = Number of best years; [c] = Valorisation/indexation conditional on financial sustainability; [d] = Discretionary indexation; DB = Defined benefit; DC =Defined contribution; f = Number of final years; fr = Fixed rate valorisation; GDP = Growth of gross domestic product; L = Lifetime average; NDC = Nonfinancial accounts; p = Valorisation/indexation with prices; w = Valorisation/indexation with average earnings; [w] = Varies with earnings; [y] = Varies with years of service.

1. Austria: valorisation assumed to move to earnings as the averaging period for the earnings measure is extended.
2. Denmark: typical contribution rate for quasi-mandatory occupational plans.
3. France: the first ceiling relates to the national pension scheme, the second to the mandatory occupational plan modelled here (ARRCO).
4. Greece: effective ceiling calculated from maximum pension.
5. Italy: indexation is fully to prices for low pensions and 75% of prices for higher pensions.
6. Japan: indexation is to wages until age 67 and to prices after age 68.
7. Poland: valorisation to wage bill growth. Indexation is to price inflation +at least 20% of real growth of average earnings in the previous year.
8. Portugal: indexation will be higher relative to prices for low pensions and vice versa. Indexation will be more generous the higher is GDP growth.
9. Sweden: the contribution rate is 2.5% for personal plans up to the ceiling for the public scheme. For quasi-mandatory occupational plans the contribution rates are 4.5% on a lower slice of earnings and 30% on an upper slice with no ceiling (in the largest scheme for private-sector workers).
10. United States: earnings valorisation to age 60; no adjustment from 60 to 62; prices valorisation from 62 to 67.

StatLink http://dx.doi.org/10.1787/888933633755

CURRENT RETIREMENT AGES

Key results

The rules for eligibility to retire and withdraw a pension benefit are complex and often reflect conflicting objectives. This is all mirrored in the different criteria for pension benefit withdrawal in different schemes. In 2016 the OECD average normal pension age was equal to 64.3 years for men and 63.7 years for women across all schemes for an individual retiring in 2016 and assuming labour market entry at age 20.

The table shows the rules for normal and early retirement by pension benefit scheme for a person entering the labour force at age 20. Assuming the same entry age for current retirement ages enables a comparison over time between the current retirement ages presented here and the future retirement ages presented in the following section and in the OECD pensions modelling. In 2016 the OECD average normal pension age was equal to 64.3 years for men and 63.7 years for women across all schemes and countries. These averages should however be interpreted with caution as they do not say anything about how individuals actually react to these ages in either the schemes or countries.

Normal pension age

The lowest normal pension ages equal 58 for women in Turkey and 60.0 for men in Luxembourg, Slovenia and Turkey. Iceland, Israel (for men only) and Norway have the highest normal pension age at 67.

In nine out of the 35 countries the pension ages still differ between men and women. In these countries the average pension age for men equalled 64.2 years and 61.7 for women. However, except for Israel, Poland and Switzerland these gender differences in the pension rules are being phased out. Turkey will still have a gender difference for full-career workers entering in 2016 but it will be phased out for those entering in 2028. Women in Chile are also eligible for the defined contribution component five years earlier than men, at age 60, but as they are not eligible to the basic pension until age 65 they are recorded as having the same normal retirement age.

In nine of the 35 countries, different rules apply to different components of the overall retirement-income package and so these are shown separately. In these nine countries there is no easy answer to what the normal retirement age is as it differs across pension schemes.

Early age

Early pension withdrawal before age 60 is often possible in occupational and private pension plans. However, some countries will not allow early retirement in any mandatory part of the pension system such as Denmark, Ireland, Israel, the Netherlands, New Zealand, Poland, Turkey and the United Kingdom. In other cases, early retirement is restricted to certain schemes: in Australia, Chile and Iceland to mandatory private pensions; and in Canada and Sweden, there is no early retirement under basic or targeted programmes but early withdrawal is possible for the earnings-related systems.

In most defined benefit and points schemes, the adjustment is simply a parameter of the pension system: the benefit is permanently reduced by *x*% for each year of early retirement.

In defined contribution systems the size of the annual benefit varies and depends on the age of benefit withdrawals through the accumulated assets and the size of the annuity divisor. The annuity divisor is calculated as a function of expected remaining life expectancy and discount rates. In these types of systems there is only an age of early pension withdrawal. In Ireland for example occupational pensions are available from the age of 50, under certain circumstances, however, it is not possible to withdraw the basic pension before the age of 66. In a similar manner it is possible to withdraw the NDC/DC pensions in a flexible manner in Sweden from the age of 61, however, if you are eligible for the basic pension, which acts as a minimum, you have to wait until 65. As a consequence the age of pension benefit withdrawal differs across earnings levels, eligibility criteria and type of pension system and obviously how important income from these schemes are for the individual to finance retirement.

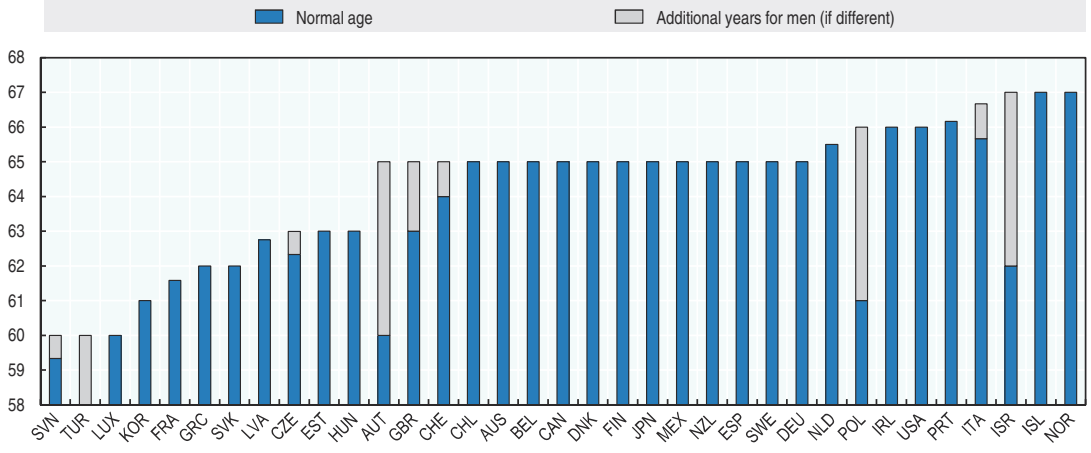
3.7 Early and normal retirement ages for an individual retiring in 2016 by type of pension scheme

		Scheme	Early age	Normal			Scheme	Early age	Normal
Australia		T	n.a.	65	Japan		Basic/DB	60	65
		DC	55	..	Korea		DB	57	61
Austria	Men	DB (ER)	64.9	65	Latvia		NDC/DC	60.75	62.75
	Women	DB (ER)	59.9	60			T	n.a.	67.75
Belgium		DB (ER)	62	65	Luxembourg		DB	60	60
		Min	n.a.	65	Mexico		T	n.a.	65
Canada		Basic/T	n.a.	65			DC	Any age/60	65
		DB (ER)	60	65	Netherlands		Basic	n.a.	65.5
Chile		Basic/T	n.a.	65			DB (Occ)		65
	Men	DC	Any age	65	New Zealand		Basic	n.a.	65
	Women	DC	Any age	60			DC	flexible	..
Czech Republic	Men	DB	60	63	Norway		Min	67	67
	Women	DB	60	62.3			NDC/DB	62	67
Denmark		Basic/T	n.a.	65	Poland	Men	NDC/Min	n.a.	66
		DC (ATP)	n.a.	65		Women	NDC/Min	n.a.	61
		DC (Occ)	60	..	Portugal		DB	65	66.2
Estonia		Points	60	63			Min	n.a.	66.2
		DC	62	..	Slovak Republic	Men	DB	Subsistance level	62
Finland		Min	63	65		Women	DB	Subsistance level	62-58.25[1]
		DB	63	65	Slovenia	Men	DB	n.a.	60
France		DB	61.6	61.6		Women	DB	n.a.	59.3
		Points	56.7	61.6	Spain		DB	61	65
Germany		Points	65	65	Sweden		Basic	n.a.	65
Greece		DB	62	62			NDC/DC	61	..
Hungary	Men	DB	n.a.	63	Switzerland	Men	DB	63	65
	Women	DB	Any with 40 years	63		Women	DB	62	64
Iceland		Basic/T	n.a.	67	Turkey	Men	DB	n.a.	60
		DB (Occ)	65	67		Women	DB	n.a.	58
Ireland		Basic/T	n.a.	66	United Kingdom	Men	Basic (SP)	n.a.	65
		DC (Occ)	50	..		Women	Basic (SP)	n.a.	63
Israel	Men	Basic/T	n.a.	67			T (PC)	n.a.	63
	Women	Basic/T	n.a.	62			DC	55	..
Italy	Men	NDC	62.8	66.6	United States		DB	62	66
	Women	NDC	61.8	65.6			T		65

Note: The normal retirement age is calculated assuming labour market entry at age 20. DB = defined benefit; DC = defined contribution; n.a. = early retirement or deferral of pension is not available; Occ =occupational; T =targeted. Where pension ages for men and women differ they are shown as Men/Women. .. = benefits automatically adjusted for early and late retirement in DC schemes.
1. Slovak Republic: For women with children the pension age is reduced dependent on the number of children.
Source: See "Country Profiles" available at *http://oe.cd/pag*.

StatLink http://dx.doi.org/10.1787/888933633793

3.8. Current retirement age in 2016 for a person who entered the labour force at age 20



StatLink http://dx.doi.org/10.1787/888933633812

FUTURE RETIREMENT AGES

Key results

Future normal and early retirement ages have been increasing. Following the changes presented herein and assuming labour market entry at age 20 in 2016 the normal retirement age will increase to 65.8 for men and 65.5 for women on average across all OECD countries against 64.3 and 63.4 years, respectively, in 2016.

The table shows the rules for normal and early retirement by pension benefit scheme for a person entering the labour force at age 20 in 2016. Across countries the average normal pension age to get a full pension for all schemes combined in 2016 was equal to 64.3 years for men and 63.4 years for women. By 2060 this age will increase to 65.8 years for men and 65.5 years for women across all OECD countries. This average should however be interpreted with caution as it does not say how individuals react to these ages in neither the schemes nor the countries. However, it does give some insight in the averages across schemes modelled currently and their evolution. During the same period, life expectancy at 65 (70) years is projected to increase on average from 24.0 to 28.7 years (19.9 to 24.2).

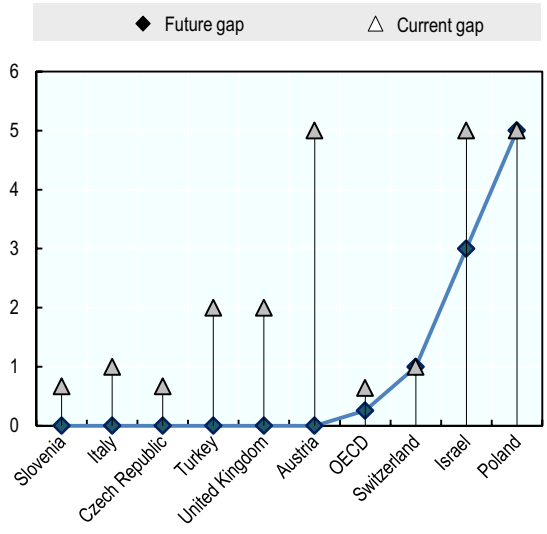
Normal pension age

The normal retirement age will increase in 18 out of 35 OECD countries for people entering at age 20. In the countries were the normal pension age is increasing the average increase is 3.3 years from the pension age of today. The highest increase is projected to happen in Denmark, assuming that all planned linkages to life expectancy increases are applied: the normal pension age would increase from 65 currently to 74 years for those who are age 20 in 2016. Two other countries rapidly increasing their normal pension age are the Slovak Republic from 62 to 68 years and the Netherlands from 65.5 to 71 years. Normal retirement ages are also set to increase above 65. In 2016, nine counties had retirement ages above 65. By 2060, five more countries will join that group, but Poland will fall out following the reversal of the planned pension age increases.

The lowest future normal retirement age will be equal to 60 in Luxembourg and Slovenia for both men and women and for women in Poland. Other countries with low normal retirement ages in the future are Greece at 62 years and France at 64 years.

In 2016 retirement age gender gaps existed in nine out of the 35 OECD countries. In these countries the average pension age for men equals 64.2 and 61.7 for women. However, by 2060 and onwards retirement age gender gaps will have been phased out everywhere except for in Israel, Poland and Switzerland. Turkey will still have a gender difference for full career workers entering in 2016 but it will be phased out for those entering in 2028.

Retirement gender age gap currently and in the future



Source: See "Country Profiles" available at *http://oe.cd/pag*.
StatLink *http://dx.doi.org/10.1787/888933633774*

Early retirement age

Early pension benefit withdrawal will still be possible in a large number of OECD countries and in some cases benefit withdrawal will still be possible before age 60. Most often this option is available in defined contribution systems that are either occupational and/or private pension plans. In the United Kingdom for example defined contribution pension pots will be eligible for withdrawal ten years before the normal retirement age. In defined contribution systems benefits are automatically actuarially adjusted. In defined benefit systems pension benefits for early retirees are usually cut to reflect the longer durations in retirement. Increasing penalties for early withdrawal has been one of most widely used reforms to increase economic incentives to defer pension benefit receipt (see Table 5.9 for the adjustments made to DB systems).

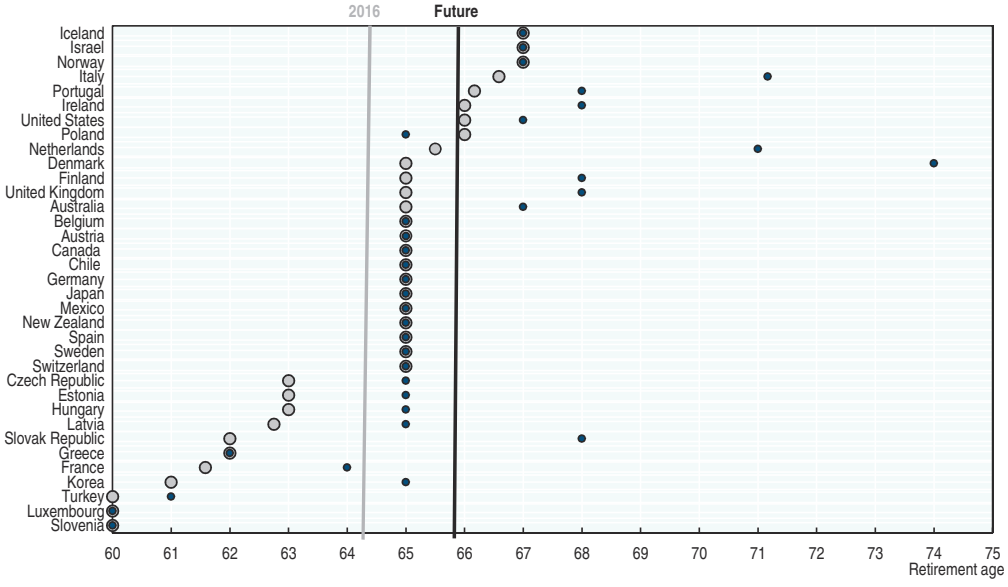
3.9. Early and normal retirement ages by type of scheme in the long-term for a person entering the labour force at age 20 in 2016

		Scheme	Early age	Reduction	Normal	Increase
Australia		T	n.a.		**67**	
		DC	60			
Austria		DB (ER)	62	5.1%	**65**	4.2%
Belgium		DB (ER)	63		**65**	
		Min	n.a.		65	
Canada		Basic/T	n.a.		**65**	7.2% (Basic/T)
		DB (ER)	60	7.2%	65	8.2%
Chile		Basic/T	n.a.		**65**	
	men	DC	any age		65	
	women	DC	any age		60	
Czech Republic		DB	60	3.6-6%	**65**	6.0%
Denmark		Basic/T	n.a.		**74**	6.9%
		DC (ATP)	n.a.		74	
		DC (Occ)	69		74	
Estonia		Points	62	4.8%	**65**	10.8%
		DC	62			
Finland		Min	65	4.8%	**68**	4.8%
		DB	65		68	4.8%
France		DB	62	5.0%	63	5.0%
		Points	57	4.0-7.0%	**64**	
Germany		Points	63	3.6%	**65**	6.0%
Greece		DB	62		**62**	
Hungary	men	DB	n.a.		**65**	6.0%
	women	DB	any with 40 years		**65**	6.0%
Iceland		Basic/T	n.a.		**67**	6.0%
		DB (Occ)	65	7.0%	67	8.0%
Ireland		Basic/T	n.a.		**68**	n.a.
Israel	men	Basic/T	n.a.		**67**	5.0%
	women	Basic/T	n.a.		**64**	5.0%
		DC			67	
Italy		NDC	67.4		**71.2**	
Japan		Basic/DB	60	6.0%	**65**	8.4%
Korea		DB	60	6.0%	**65**	7.2%
Latvia		NDC/DC	63		**65**	
		T	n.a.		65	
Luxembourg		DB	60		**60**	n.a.
Mexico		T	n.a.		**65**	
		DC	any age/60	-	65	-
Netherlands		Basic	n.a.		**71**	n.a.
		DB (Occ)			65	
New Zealand		Basic	n.a.		**65**	
		DC	flexible			
Norway		Min	67		**67**	
		NDC/DB	62			
		DC (Occ)	62			
Poland	men	NDC/Min	n.a.		**65**	
	women	NDC/Min	n.a.		**60**	
Portugal		DB	60		**68**	
		Min	n.a.		68	
Slovak Republic		DB	66	6.5%	**68**	6.0%
		DC	62		68	
Slovenia		DB	n.a.		**60**	4-12%
Spain		DB	n.a.		**65**	2%-4%
Sweden		GARP	n.a.		**65**	
		NDC/DC	61			
		DC (Occ)	55		65	
Switzerland	men	DB	63	6.8%	**65**	5.2-6.3%
	women	DB	62	6.35-7.1%	**64**	4.5-5%
Turkey	men	DB	n.a.		**61**	
	women	DB	n.a.		**59**	
United Kingdom		Basic	n.a.		**68**	5.8%
United States		DB	62	5.0/6.7%	**67**	8.0%
		T	n.a.		65	

Note: DB = defined benefit; DC = defined contribution; n.a. = early retirement or deferral of pension is not available; Occ = occupational; T = targeted. Where pension ages for men and women differ they are shown separately. Benefits automatically adjusted for early and late retirement in DC schemes. Data rounded to one decimal place. The reference retirement age used in the modelling has been bolded.
Source: See "Country Profiles" available at *http://oe.cd/pag*.

StatLink http://dx.doi.org/10.1787/888933633831

3.10. Current and future retirement ages for a man entering the labour market at age 20



StatLink http://dx.doi.org/10.1787/888933633850

Chapter 4

Pension entitlements

Pension entitlements are calculated using the OECD pension models. The theoretical calculations are based on national parameters and rules that apply in 2016. They relate to workers entering the labour market in 2016 at the age of 20 and include the full impact of pension reforms that have been legislated and are being phased in. A note on the methodology used and assumptions made precedes the pension indicators.

The indicators begin with the gross pension replacement rate in mandatory pension schemes: the ratio of pensions to individual earnings. The second shows the replacement rates for mandatory and voluntary pension schemes where these schemes have broad coverage. Thereafter follows an analysis of the tax treatment of pensions and pensioners. The fourth and fifth indicator shows the net replacement rates, taking account of taxes and contributions. After this follows two indicators of pension wealth: the lifetime discounted value of the flow of retirement benefits. This indicator also takes into account the retirement age, indexation of benefits, and life expectancy. The pension wealth indicator is presented in gross and net terms. The final indicator shows the gross replacement rate for mandatory pension schemes with a varying earnings profile.

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.

METHODOLOGY AND ASSUMPTIONS

Introduction

The indicators of pension entitlements that follow here in Chapter 4 use the OECD cohort based pension models. The methodology and assumptions are common to the analysis of all countries, allowing the design of pension systems to be compared directly. This enables the comparison of future entitlements under today's parameters and rules.

The pension entitlements that are presented are those that are currently legislated in OECD countries. Reforms that have been legislated before publication are included where sufficient information is available. Changes that have already been legislated and are being phased-in gradually and yearly are modelled from the year that they are implemented and onwards.

The values of all pension system parameters reflect the situation in the year 2016 and onwards. The calculations show the pension benefits of a worker who enters the system that year at age 20 and retires after a full career. The main results are shown for a single person. All indexation and valorisation rules follow what is legislated in the baseline scenario.

Career length

A full career is defined here as entering the labour market at age of 20 and working until the normal pension age defined by this entry age (see indicator on "Future retirement ages"). The implication is that the length of career varies with the statutory retirement age: 40 years for retirement at 60, 45 with retirement age at 65, etc.

People often spend periods out of paid work in unemployment, full-time education, caring for children, disabled or elderly relatives, etcHowever, most OECD countries have mechanisms in place to protect the pension entitlements for such periods. Rules for periods of unemployment and caring for children, which are often very complex, are set out in the online "Country Profiles" available at *http://oe.cd/pag*. The OECD pension models include these rules. For reasons of space the results are not presented here, however Chapter 3: "How incomplete careers affect pension entitlements" of *Pensions at a Glance 2015* provides detailed results.

Coverage

The pension models presented here include all mandatory pension schemes for private-sector workers, regardless of whether they are public (i.e. they involve payments from government or from social security institutions, as defined in the System of National Accounts) or private. For each country, the main national scheme for private-sector employees is modelled. Schemes for civil servants, public-sector workers and special professional groups are excluded.

Schemes with near-universal coverage are also included, provided that they cover at least 85% of employees. Such plans are called "quasi-mandatory" in this report. They are particularly significant in Denmark, the Netherlands and Sweden.

An increasing number of OECD countries have broad coverage of voluntary, occupational pensions and these play an important role in providing retirement incomes. For these countries, a second set of results for replacement rates is shown with entitlements from these voluntary pension plans.

Resource-tested benefits for which retired people may be eligible are also modelled. These can be means-tested, where both assets and income are taken into account, purely income-tested or withdrawn only against pension income. The calculations assume that all entitled pensioners take up these benefits. Where there are broader means tests, taking account also of assets, the income test is taken as binding. It is assumed that the whole of income during retirement comes from the mandatory pension scheme (or from the mandatory plus voluntary pension schemes in those countries where the latter are modelled).

Pension entitlements are compared for workers with a range of different earnings levels: between 0.5 times and three times the average worker earnings (AW). This range permits an analysis of future retirement benefits of both the poorest and richer workers.

Economic variables

The comparisons are based on a single set of economic assumptions for all the OECD countries and other major economies analysed. In practice, the level of pensions will be affected by economic growth, rate of return on financial assets, real wage growth, the discount rate and inflation, and these will vary across countries. A single set of assumptions, however, ensures that the outcomes of the different pension regimes are not affected by different economic conditions. In this way, differences across countries in pension levels reflect differences in pension systems and policies alone. The baseline assumptions are set out below.

Price inflation is assumed to be 2% per year. ***Real earnings*** are assumed to grow by 1.25% per year on average (given the assumption for price inflation, this implies nominal wage growth of 3.275%). ***Individual earnings*** are

assumed to grow in line with the economy-wide average. This means that the individual is assumed to remain at the same point in the earnings distribution, earning the same percentage of average earnings in every year of the working life. The exception is the earnings profile indicator, where earnings are not held steady. The ***real rate of return*** on funded, defined-contribution pensions is assumed to be 3% per year. Administrative charges, fee structures and the cost of buying an annuity are assumed to result in a ***defined contribution conversion factor*** of 90% applied to the accumulated defined contribution wealth when calculating the annuity (last edition of the publication assumed 85%). The ***real discount rate*** (for actuarial calculations) is assumed to be 2% per year. Chapter 4 in the 2015 edition of *Pensions at a Glance* includes a sensitivity analysis to the various parameters used here.

The baseline modelling uses country-specific projections of ***mortality rate*** from the United Nations population database for every year from 2016 to 2080. Previous editions of the publication have used period based mortality, whilst this edition has moved to cohort based mortality to fully reflect the continuing life expectancy increases that apply even after retirement.

The calculations assume that benefits from defined contribution plans are paid in the form of a price-indexed life annuity at an actuarially fair price assuming perfect foresight. This is calculated from the mortality projections once the conversion factor is taken into account. If people withdraw the money in alternative ways, the capital sum at the time of retirement is the same: it is only the way that the benefits are spread that is changed. Similarly, the notional annuity rate in notional accounts schemes is (in most cases) calculated from mortality data using the indexation rules and discounting assumptions employed by the respective country.

The change in the conversion factor only affects those countries that have defined contribution schemes. Although the increase in the conversion factor from 85% to 90% has increased the replacement rates this increase is mostly offset by the increasing life expectancy from the cohort approach, as shown in Table 4.1. Across the countries shown the average replacement rate for an average earner in the baseline case is 52.3% in this edition of *Pensions at a Glance*. With the 2015 methodology, this average replacement would be slightly lower at 51.6%. If only the conversion factor had been increased the new replacement rate would have been 53.4%, whilst just changing to cohort mortality would lead to a replacement rate of 50.5%.

Moving from period to cohort life expectancy estimates increases the pension wealth in all countries.

Taxes and social security contributions

Information on personal income tax and social security contributions paid by pensioners, which were used to calculate pension entitlements, are in the "Country Profiles" available at *http://oe.cd/pag*.

The modelling assumes that tax systems and social-security contributions remain unchanged in the future. This constant policy assumption implicitly means that "value" parameters, such as tax allowances or contribution ceilings, are adjusted annually in line with average worker earnings, while "rate" parameters, such as the personal income tax schedule and social security contribution rates, remain unchanged.

General provisions and the tax treatment of workers for 2016 can be found in the OECD's *Taxing Wages* report. The conventions used in that report, such as which payments are considered taxes, are followed here.

Sources and further reading

OECD (2017), *Taxing Wages 2017*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/tax_wages-2017-en*.

4.1. Impact of parameter changes on gross replacement rates

	PAG 2015 methodology			Changing to cohort mortality only			Higher conversion factor only			New base case		
	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5
Australia	81.5	31.6	31.6	80.2	30.4	30.4	84.1	33.5	33.5	82.8	32.2	32.1
Chile	38.6	32.7	32.8	37.8	31.6	31.7	39.9	34.7	34.7	39.1	33.5	33.6
Denmark	122.0	84.4	77.4	120.9	82.8	75.8	124.6	88.1	81.2	123.4	86.4	79.5
Estonia	61.5	49.2	45.1	60.8	48.6	44.5	62.7	50.4	46.3	62.0	49.7	45.6
Israel	98.9	67.4	44.9	96.1	65.1	43.4	102.5	70.2	46.8	99.4	67.8	45.2
Latvia	47.0	47.0	47.0	46.3	46.3	46.3	48.3	48.3	48.3	47.5	47.5	47.5
Norway	63.5	45.0	36.4	63.3	44.8	36.1	63.8	45.4	36.7	63.6	45.1	36.5
Sweden	55.4	55.4	63.8	54.7	54.7	62.4	56.5	56.5	65.9	55.8	55.8	64.5
Average	**71.0**	**51.6**	**47.4**	**70.0**	**50.5**	**46.3**	**72.8**	**53.4**	**49.2**	**71.7**	**52.3**	**48.1**

Source: OECD pension models.

StatLink *http://dx.doi.org/10.1787/888933633869*

GROSS PENSION REPLACEMENT RATES

Key results

The future gross replacement rate shows the level of pension benefits in retirement from mandatory public and private pension schemes relative to earnings when working. For full-career workers with average earnings, the future gross replacement rate averages 53% for men and 52% for women in the 35 OECD countries, with substantial cross-country variation. At the bottom of the range, the United Kingdom offer future replacement rates of 22% at the average wage to people starting work at age 20 today. The Netherlands, at the top of the range, offers replacement rates of slightly less than 97%.

Most OECD countries aim to protect low-income workers (here defined as workers earning half of average worker earnings) from old-age poverty, which results in higher replacement rates for them than for average worker earners. Low-income workers would receive gross replacement rates averaging around 65%, compared with 53% for average-wage workers. Some countries, such as Ireland, pay relatively small benefits to average earners, but are closer to average for low-income workers. However, projected replacement rates in ten countries are the same for a full career at average and half-average pay: Austria, Finland, Germany, Hungary, Italy, Latvia, Poland, Spain, Sweden and Turkey.

At the top of the range, low earners in Denmark would receive a future replacement rate of 123%; retirement benefits are thus higher than their earnings when working. At the other end of the scale, Mexico offers gross replacement rates of 35% to low-income earners, thus implying a retirement income lower than 20% of average earnings after a full career. On average in the 35 OECD countries, the gross replacement rate at 1.5 times average earnings (here called "high earnings") is 48%, somewhat below the 53% figure for average earners. Replacement rates for these high earners equal 97% in the Netherlands, while at the other end of the spectrum, the United Kingdom offers a replacement rate of around 15%.

All of the replacement rates are calculated for full-career workers from the age of 20, which means that career lengths differ between countries. Denmark has an estimated long-term retirement age of 74 years for those starting in 2016, whilst in Turkey it will be 59 for women and in both Luxembourg and Slovenia retirement will still be possible at age 60 for both men and women.

Gross pension replacement rates differ for women in eight countries (due to a lower pension eligibility age for women than for men, gender specific accrual rates or the use of sex specific mortality rates to compute annuities): Australia, Chile, Israel, Mexico, Poland, Slovenia, Switzerland and Turkey. Differences between the sexes are substantial in Australia, Chile, Israel and Poland, with replacement rates (i.e. annual benefits) for women being between 7% and 27% lower than for men. In Slovenia, however, the replacement rates for women are 5% greater due to a higher accrual rate. This difference will be phased out for those entering the labour market from 2023. For the non-OECD countries there is a wide range in the projected replacement rates, with South Africa around 16% and India at 87% for average earners.

Gross pension replacement rates fall with age from 53% on average at the time of retirement to 47% at age of 80. This difference is due to the indexation of pension benefits in payment, which do not follow wages in many countries. Austria, France, Greece, Spain and Sweden have the biggest drop around 1113 percentage points between the retirement age and age 80. Countries where the indexation of pension benefits follows wages have the same replacement rate at age 80.

Definition and measurement

The old-age pension replacement rate measures how effectively a pension system provides a retirement income to replace earnings, the main source of income before retirement. The gross replacement rate is defined as gross pension entitlement divided by gross pre-retirement earnings.

Often, the replacement rate is expressed as the ratio of the pension to final earnings (just before retirement). Under the baseline assumptions, workers earn the same percentage of average worker earnings throughout their career. Therefore, final earnings are equal to lifetime average earnings revalued in line with economy-wide earnings growth. Replacement rates expressed as a percentage of final earnings are thus identical to those expressed as a percentage of lifetime earnings. However, if people move up the earnings distribution as they get older, then their earnings just before retirement will be higher than they were on average over their lifetime as average earnings are lower than those just before retirement. Total pension entitlements, and therefore pension benefits, are therefore lower than if they had spent the whole career at the final wage.

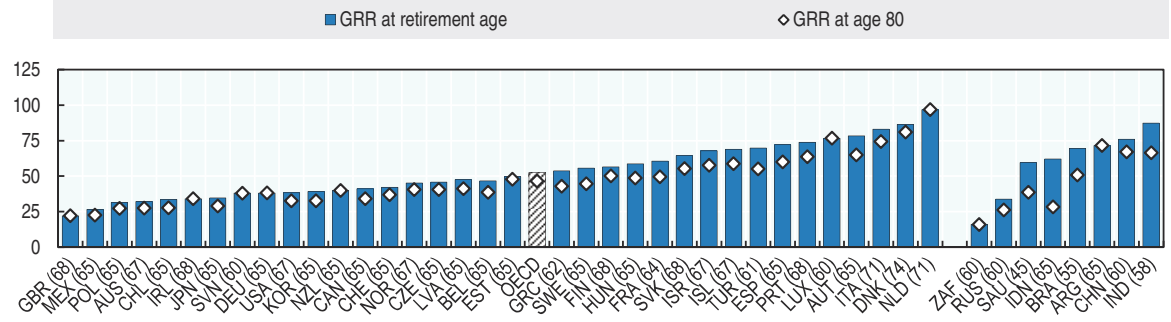
4.2. Gross pension replacement rates by earnings

	Individual earnings, multiple of mean for men (women where different)								
	Pension age	0.5	1	1.5		Pension age	0.5	1.0	1.5
OECD members					**OECD members** (cont.)				
Australia	67	82.8 (80.0)	32.2 (29.4)	32.1 (29.3)	New Zealand	65	80.0	40.0	26.7
Austria	65	78.4	78.4	78.4	Norway	67	63.6	45.1	36.5
Belgium	65	47.7	46.7	36.4	Poland	65 (60)	31.6 (30.0)	31.6 (27.9)	31.6 (27.9)
Canada	65	54.1	41.0	28.5	Portugal	68	75.5	74.0	72.6
Chile	65	39.1 (36.9)	33.5 (30.3)	33.6 (30.4)	Slovak Republic	68	72.3	64.3	62.2
Czech Republic	65	74.1	45.8	36.4	Slovenia	60	44.0 (46.3)	38.1 (40.1)	36.3 (38.2)
Denmark	74	123.4	86.4	79.5	Spain	65	72.3	72.3	72.3
Estonia	65	62.0	49.7	45.6	Sweden	65	55.8	55.8	64.5
Finland	68	56.6	56.6	56.6	Switzerland	65 (64)	56.0 (55.4)	42.1 (41.8)	28.5 (28.2)
France	64	60.5	60.5	54.8	Turkey	61 (59)	69.9 (67.0)	69.9 (67.0)	69.9 (67.0)
Germany	65	38.2	38.2	38.2	United Kingdom	68	44.3	22.1	14.8
Greece	62	67.4	53.7	49.2	United States	67	48.3	38.3	31.7
Hungary	65	58.7	58.7	58.7	**OECD**	**65.8 (65.5)**	**64.6 (64.1)**	**52.9 (52.3)**	**48.4 (47.9)**
Iceland	67	77.6	69.0	67.9					
Ireland	68	68.2	34.1	22.7	Argentina	65 (60)	81.7 (74.0)	71.6 (64.3)	68.2 (61.1)
Israel	67 (64)	99.4 (89.7)	67.8 (60.0)	45.2 (40.0)	Brazil	55 (50)	85.0	69.5 (52.9)	69.5 (52.9)
Italy	71	83.1	83.1	83.1	China	60 (55)	96.0 (82.6)	76.0 (65.1)	69.4 (59.2)
Japan	65	47.8	34.6	30.2	India	58	87.4 (83.1)	87.4 (83.1)	87.4 (83.1)
Korea	65	58.5	39.3	28.7	Indonesia	65	62.1 (57.8)	62.1 (57.8)	62.1 (57.8)
Latvia	65	47.5	47.5	47.5	Russian Federation	60 (55)	46.1 (41.0)	33.7 (28.6)	29.1 (24.1)
Luxembourg	60	89.5	76.7	72.5	Saudi Arabia	45	59.6	59.6	59.6
Mexico	65	34.7	26.4 (24.8)	25.1 (23.5)	South Africa	60	32.1	16.0	10.7
Netherlands	71	98.1	96.9	96.5	EU28	65.9 (65.5)	69.6 (69.5)	58.3 (58.2)	54.5 (54.3)

Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933633888

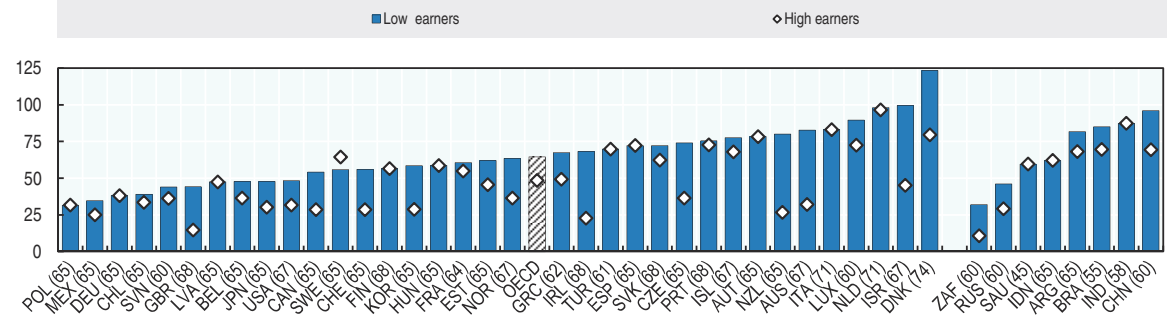
4.3. Gross pension replacement rates: Average earners at retirement age and age 80



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933633907

4.4. Gross pension replacement rates: Low and high earners



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933633926

GROSS REPLACEMENT RATES: PUBLIC VS PRIVATE, MANDATORY VS VOLUNTARY SCHEMES

Key results

Private pensions play large role in about half of OECD countries. For mandatory schemes, the OECD average for gross replacement rates of an average earner from public schemes alone is 41%, compared with 53% with private pensions included. When voluntary private pensions are taken into account, the OECD average increases to 59%. For the eight OECD countries where voluntary private pensions are widespread the average replacement rate is 63% for an average earner choosing to contribute compared with 37% when only mandatory schemes are considered.

Table 4.5 shows the interplay between mandatory public, mandatory private and voluntary pension schemes. As shown in the previous indicator, the average replacement rate from mandatory schemes for a full-career average earner is equal to 53%: for the 15 OECD countries where the calculations of entitlements only cover mandatory public pensions, the average replacement rate for an average worker earner is 59%; for the 12 OECD countries with both public and mandatory private provision, the average replacement rate is 56%; and for the last eight countries, where the only mandatory part is public but with significant voluntary pensions, the replacement rate from the mandatory component alone is 37%. For all 35 OECD countries, including voluntary (private) pensions raises the average total replacement rate for the average earner from 53% with mandatory schemes to 59%.

Australia, Denmark, Iceland and Norway have highly targeted public programmes, where public replacement rates for low earners are often topped up with mandatory private pension provisions. In Chile, Mexico, the Slovak Republic and Sweden, part of the public provision has been replaced as a result of reforms within mandatory private pensions. Canada, Ireland, the United Kingdom and the United States have long had relatively low public pensions and widespread voluntary provision.

Of the other major economies, public pensions are mandatory in Argentina, Brazil, China, India, Indonesia, the Russian Federation and Saudi Arabia. South Africa is the exception having only voluntary private schemes, with the public pension being withdrawn for even those at 50% of average earnings, because of its means-tested component.

Mandatory private pensions

Mandatory private pensions exist in 12 countries. Denmark, the Netherlands and Sweden include private pensions that have near-universal coverage and which are described as "quasi-mandatory".

In Iceland, the Netherlands and Switzerland, private pensions are mainly defined benefit, whilst in the other countries they are defined contribution. Replacement rates from mandatory private schemes range from 6% in Norway to over 60% in Denmark, Iceland and the Netherlands. All of the other countries are between 18% and 34%, with the exception of Israel at 49%. In Sweden the contribution rate for the private pension increases from 4.5% below to 30% above the ceiling for the public scheme, hence why the total replacement rate is higher for high earners than average earners.

Voluntary private pensions

Voluntary private pensions are shown for seven countries where voluntary private pensions are widespread (see the indicator of "Coverage of private pension plans" in Chapter 8). It is assumed that workers with voluntary private pensions spend a full career in the scheme. Voluntary private pensions include both voluntary occupational and voluntary personal. In all seven countries, a defined-contribution plan is modelled.

When voluntary private pension are taken into account for Belgium, Canada, Germany, Ireland, New Zealand, the United Kingdom and the United States the average replacement, for these seven countries, is 60% for an average earner compared with 36% when only mandatory schemes are considered. The voluntary component has the largest impact on the replacement rate (more than 30 percentage points) in the United Kingdom, the United States and Ireland.

In general, the defined-contribution schemes pay a constant replacement rate with earnings (data on actual contribution rates by earnings are not available for most countries, and so an average or typical rate is assumed across the earnings range, (see the individual "Country Profiles" available at *http://oe.cd/pag*).It is also assumed that individuals participate fully, irrespective of their earnings level. Belgium and Germany are the exceptions due to a ceiling on pensionable earnings that qualify for tax incentives and a ceiling equal to 156% of average worker earnings, respectively.

4.5. Gross pension replacement rates from mandatory public, mandatory private and voluntary private pension schemes

Percentage of individual earnings

	Mandatory Public			Mandatory private (DB and DC)			Total mandatory			Voluntary (DB and DC)			Total with voluntary		
	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5
Australia	50.7	0.1	0.0	32.1	32.1	32.1	82.8	32.2	32.1				82.8	32.2	32.1
Austria	78.4	78.4	78.4				78.4	78.4	78.4				78.4	78.4	78.4
Belgium	47.7	46.7	36.4				47.7	46.7	36.4	14.2	14.2	11.1	61.8	60.8	47.5
Canada	54.1	41.0	28.5				54.1	41.0	28.5	34.2	34.2	44.2	82.9	75.2	72.6
Chile	5.8	0.0	0.0	33.4	33.5	33.6	39.1	33.5	33.6				39.1	33.5	33.6
Czech Republic	74.1	45.8	36.4				74.1	45.8	36.4				74.1	45.8	36.4
Denmark	45.9	14.8	9.9	77.6	71.6	69.6	123.4	86.4	79.5				123.4	86.4	79.5
Estonia	41.4	29.1	25.0	20.6	20.6	20.6	62.0	49.7	45.6				62.0	49.7	45.6
Finland	56.6	56.6	56.6				56.6	56.6	56.6				56.6	56.6	56.6
France	60.5	60.5	54.8				60.5	60.5	54.8				60.5	60.5	54.8
Germany	38.2	38.2	38.2				38.2	38.2	38.2	12.7	12.7	12.7	50.9	50.9	50.9
Greece	67.4	53.7	49.2				67.4	53.7	49.2				67.4	53.7	49.2
Hungary	58.7	58.7	58.7				58.7	58.7	58.7				58.7	58.7	58.7
Iceland	11.8	3.2	2.1	65.8	65.8	65.8	77.6	69.0	67.9				77.6	69.0	67.9
Ireland	68.2	34.1	22.7				68.2	34.1	22.7	38.0	38.0	38.0	106.2	72.1	60.7
Israel	38.7	19.4	12.9	60.7	48.5	32.3	99.4	67.8	45.2				99.4	67.8	45.2
Italy	83.1	83.1	83.1				83.1	83.1	83.1				83.1	83.1	83.1
Japan	47.8	34.6	30.2				47.8	34.6	30.2	23.1	23.1	23.1	71.0	57.7	53.3
Korea	58.5	39.3	28.7				58.5	39.3	28.7				58.5	39.3	28.7
Latvia	47.5	47.5	47.5				47.5	47.5	47.5				47.5	47.5	47.5
Luxembourg	89.5	76.7	72.5				89.5	76.7	72.5				89.5	76.7	72.5
Mexico	12.2	4.0	2.7	22.4	22.4	22.4	34.7	26.4	25.1				34.7	26.4	25.1
Netherlands	57.4	28.7	19.1	40.7	68.2	77.3	98.1	96.9	96.5				98.1	96.9	96.5
New Zealand	80.0	40.0	26.7				80.0	40.0	26.7	18.8	18.8	18.8	98.8	58.8	45.4
Norway	58.8	39.2	30.2	4.8	5.9	6.3	63.6	45.1	36.5				63.6	45.1	36.5
Poland	31.6	31.6	31.6				31.6	31.6	31.6				31.6	31.6	31.6
Portugal	75.5	74.0	72.6				75.5	74.0	72.6				75.5	74.0	72.6
Slovak Republic	47.5	39.6	37.4	24.8	24.8	24.8	72.3	64.3	62.2				72.3	64.3	62.2
Slovenia	44.0	38.1	36.3				44.0	38.1	36.3				44.0	38.1	36.3
Spain	72.3	72.3	72.3				72.3	72.3	72.3				72.3	72.3	72.3
Sweden	36.6	36.6	27.6	19.2	19.2	36.9	55.8	55.8	64.5				55.8	55.8	64.5
Switzerland	36.7	24.2	16.5	19.2	17.9	12.0	56.0	42.1	28.5				56.0	42.1	28.5
Turkey	69.9	69.9	69.9				69.9	69.9	69.9				69.9	69.9	69.9
United Kingdom	44.3	22.1	14.8				44.3	22.1	14.8	30.0	30.0	30.0	74.3	52.2	44.8
United States	48.3	38.3	31.7				48.3	38.3	31.7	33.0	33.0	33.0	81.3	71.3	64.7
OECD	**52.6**	**40.6**	**36.0**				**64.6**	**52.9**	**48.4**				**70.3**	**58.7**	**54.4**
Argentina	81.7	71.6	68.2				81.7	71.6	68.2				81.7	71.6	68.2
Brazil	85.0	69.5	69.5				85.0	69.5	69.5				85.0	69.5	69.5
China	96.0	76.0	69.4				96.0	76.0	69.4				96.0	76.0	69.4
India	87.4	87.4	87.4				87.4	87.4	87.4				87.4	87.4	87.4
Indonesia	34.3	34.3	34.3	27.9	27.9	27.9	62.1	62.1	62.1				62.1	62.1	62.1
Russian Federation	28.2	15.8	11.2	18.0	18.0	18.0	46.1	33.7	29.1				46.1	33.7	29.1
Saudi Arabia	59.6	59.6	59.6				59.6	59.6	59.6				59.6	59.6	59.6
South Africa	0.0	0.0	0.0				0.0	0.0	0.0	48.8	48.8	48.8	48.8	48.8	48.8
EU28	54.9	45.9	42.2				69.6	58.3	54.5				73.0	61.7	57.8

DB = defined benefit; DC = defined contribution.
Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933633945

TAX TREATMENT OF PENSIONS AND PENSIONERS

Key results

The personal tax system plays an important role in old-age support. 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 treatment either to pension incomes or to pensioners, through additional allowances or credits to older people.

More than half (20 out of 35) OECD countries provide older people with additional basic relief under the personal income tax. Generally, this takes the form of an extra tax allowance or tax credit. In many cases – Canada and the United Kingdom, for example – this additional relief is phased out for older people with higher incomes.

A significant number of countries offer tax relief for particular sources of retirement income. Relief from income tax for public pensions, either full or partial, is available in 14 OECD countries. For example, between 15% and 50% of income from public pensions (social security) in the United States is not taxed, depending on the total income of the pensioner. In Australia, for example, benefits derived from pension contributions and investment returns that have been taxed are not taxable in payment for over 60s. This therefore applies to the mandatory defined contribution scheme and voluntary contributions to such plans.

In contrast some countries such as Denmark, Iceland, the Netherlands and Sweden tax earned income from work less than pensions.

Overall, 27 OECD countries have some concession for older people or pension income under their personal income taxes. In only eight is the tax treatment of pensions and pensioners at least the same as it is for people of working age.

Virtually all OECD countries levy employee social security contributions on workers: Australia and New Zealand are the only exceptions. In addition to these two countries, a further 18 do not levy social security contributions on pensioners. The rate of contributions in the 15 countries that *do* levy social security contributions on retirees is always lower than the rate charged on workers. Typically, older people do not pay contributions for pensions or unemployment (for obvious reasons). However, pensioners can be subject to levies to pay for health or long-term care and, in some cases, are liable for "solidarity" contributions to finance a broad range of benefits.

Empirical results

The charts show the percentage of income paid in taxes and contribution by workers and pensioners.

Starting with workers, countries have been ranked by the proportion of income paid in tax at an average earner level. This is then compared to the replacement rate that an average earner would see in retirement (as set out in the indicator of "Gross pension replacement rates" above). In eight OECD countries and six other major economies, such a pensioner would not pay any income tax in retirement. In some cases, such as the Slovak Republic and Turkey, this is because pensions are not taxable. In Ireland and the United Kingdom it is because the pension income would be less than the basic income-tax relief offered to older people. Pensioners with the gross replacement rate for an average earner would pay 12% of their income in taxes and contributions on average across the OECD.

The chart aims to show directly the impact of different tax and contribution treatment of earnings and pensions. The amount of taxes and contributions paid by an average earner worker – so not including any contributions from the employer – averages 27% in OECD countries and 12% in other major economies.

The last comparison shows how much a pensioner would pay with the same income: that is, a pension worth the same as average earnings. This averages 18% in OECD countries, some nine percentage points lower than workers' pay with the same level of income.

The difference between this 18% rate for pensioners with an income equal to average earnings and the 12% paid in taxes and contributions paid on the income which is equal to the gross replacement rate for an average earner illustrates the impact of progressivity in income-tax systems for pensioners.

Further reading

Keenay, G. and E.R. Whitehouse (2003), "The Role of the Personal Tax System in Old-age Support: A Survey of 15 Countries", *Fiscal Studies*, Vol. 24, No. 1, pp. 1-21.

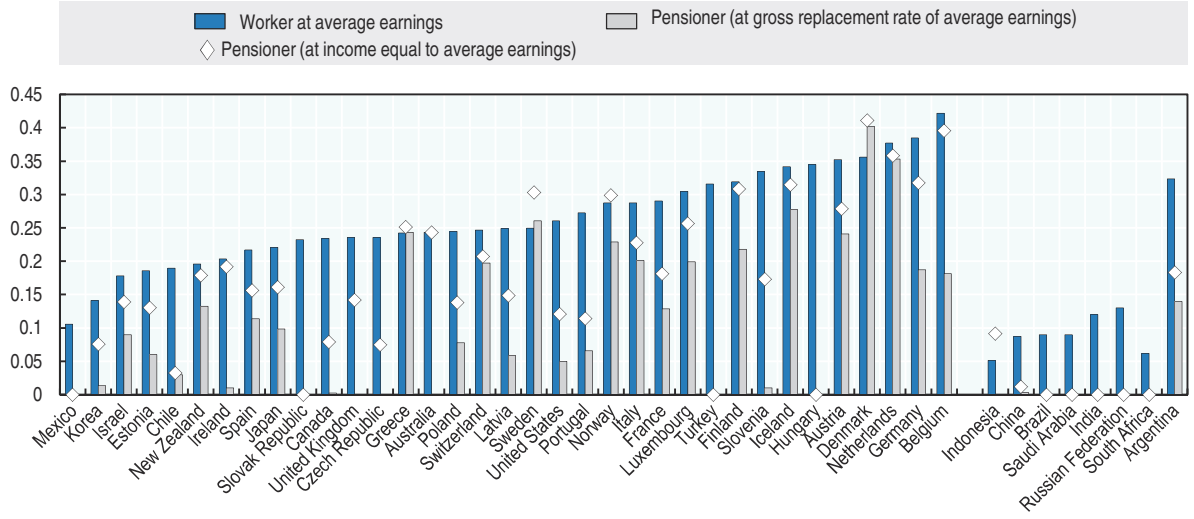
4.6. Treatment of pensions and pensioners under personal income tax and social security contributions

	Extra tax	Full or partial relief for pension income		Social security contributions		Extra tax	Full or partial relief for pension income		Social security contributions
	Allowance/ credit	Public scheme	Private scheme	Pensions		Allowance/ credit	Public scheme	Private scheme	Pensions
OECD members					**OECD members** (cont.)				
Australia	✓	✓	✓	None	Netherlands	✓			Low
Austria				Low	New Zealand				None
Belgium		✓		Low	Norway	✓	✓		Low
Canada	✓	✓	✓	None	Poland				Low
Chile	✓			None	Portugal	✓			None
Czech Republic	✓	✓		None	Slovak Republic		✓		None
Denmark				None	Slovenia	✓			Low
Estonia	✓			None	Spain		✓		None
Finland		✓		Low	Sweden	✓			None
France				Low	Switzerland				Low
Germany		✓	✓	Low	Turkey		✓		None
Greece				Low	United Kingdom	✓			None
Hungary		✓	✓	None	United States	✓	✓		None
Iceland				None					
Ireland	✓			Low	Argentina		✓		Low
Israel	✓			Low	Brazil		✓		None
Italy	✓		✓	None	China				None
Japan	✓	✓	✓	Low	India	✓			None
Korea	✓	✓		None	Indonesia				None
Latvia	✓			None	Russian Federation				Low
Luxembourg	✓			Low	Saudi Arabia				Low
Mexico			✓	None	South Africa	✓			None

Source: See online "Country Profiles available at *http://oe.cd/pag*.

StatLink http://dx.doi.org/10.1787/888933633964

4.7. Personal income taxes and social security contributions paid by pensioners and workers



Source: OECD pension models; OECD tax and benefit models.

StatLink http://dx.doi.org/10.1787/888933633983

NET PENSION REPLACEMENT RATES

Key results

Whilst the gross replacement rate gives a clear indication of the design of the pension system, the net replacement will matter more to the individual, as it reflects their disposable income in retirement in comparison to when working. For average earners, the net replacement rate from mandatory pension schemes averages 63% across the OECD, which is 10 percentage points higher than the average gross replacement rate. This reflects the higher effective tax and social contribution rates that people pay on their earnings than on their pensions in retirement, mostly due to the progressivity of tax systems, some tax advantages to pensions and the absence of pension contributions on pension benefits. Net replacement rates vary across a large range, from less than 30% in Mexico and the United Kingdom to over 100% in the Netherlands and Turkey for average-wage workers. For low earners (with half of average worker earnings), the average net replacement rate across OECD countries is 73% while it is 59% for high earners (150% of average worker earnings).

The previous indicator of the "Tax treatment of pensions and pensioners" showed the important role that the personal tax and social security contribution systems play in old-age income support. Pensioners often only pay health contributions and receive preferential treatment under the income tax. Tax expenditures and the progressivity of income taxes coupled with gross replacement rates of less than 100% also mean that pensioners have a lower income tax rate than workers. As a result, net replacement rates are generally higher than gross replacement rates.

For average earners, the net replacement rate across the OECD averages 63% for mandatory schemes, from a low of 29% in Mexico and the United Kingdom to a high of about 101% in the Netherlands and 102% in Turkey. Moreover, the pattern of replacement rates across countries is different on a net rather than a gross basis.

On average, for average earners, the net replacement rate is ten percentage points higher than the gross replacement rate. The difference is over 30 percentage points in Hungary and Turkey and around 20 percentage points in Belgium, Portugal, the Slovak Republic and Slovenia. In Hungary, the Slovak Republic and Turkey, pension income is neither liable for taxes or social security contributions, whilst in Belgium and Portugal they are much lower because of either higher tax allowances or much lower contribution levels.

For low earners, the effect of taxes and contributions on net replacement rates is more muted than for workers higher up the earnings scale. This is because low income workers typically pay less in taxes and contributions relative to average earners. In many cases, their retirement incomes are below the level of the standard reliefs in the personal income tax (allowances, credits, etc.). Thus, they are often unable to benefit fully from any additional concessions granted to pensions or pensioners under their personal income tax.

The difference between gross and net replacement rates for low earners is 9 percentage points on average. Belgium, Germany, Portugal, Slovenia and Turkey have much higher replacement rates for low earners on a net basis than in gross terms. The net replacement rate for workers earning 150% of the average is highest in Turkey. The lowest replacement rates for high earners are found in Ireland, Mexico, New Zealand, Switzerland and the United Kingdom where workers earning 150% of the average will receive pensions that amount to less than one-third of their net earnings when working. In addition to the higher contribution levels in the occupational system for higher earners in Sweden, the net replacement rates are furthermore affected by the fact that pension income and work income are taxed differently and at different rates.

For non-OECD countries, there is very little variation in net replacement rates within countries across the earnings range. However, there is considerable difference between countries, ranging from 13% for average earners in South Africa to 93% in India. As with the gross rates, the EU28 average net replacement rate for average earners is markedly higher than the OECD35 figure, at 72%.

Definition and measurement

The net replacement rate is defined as the individual net pension entitlement divided by net pre-retirement earnings, taking account of personal income taxes and social security contributions paid by workers and pensioners. Otherwise, the definition and measurement of the net replacement rates are the same as for the gross replacement rate. Details of the rules that national tax systems apply to pensioners can be found in the online Country Profiles available at *http://oe.cd/pag*.

4.8. Net pension replacement rates by earnings

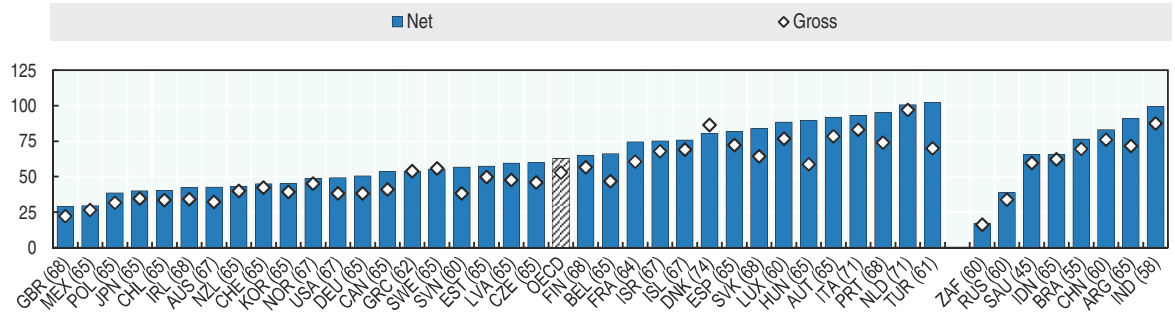
	Individual earnings, multiple of mean for men (women where different)			
	Pension age	0.5	1	1.5
OECD members				
Australia	67	95.0 (91.8)	42.6 (38.8)	45.4 (41.4)
Austria	65	92.2	91.8	90.9
Belgium	65	62.6	66.1	50.1
Canada	65	62.2	53.4	38.5
Chile	65	48.3 (45.6)	40.1 (36.3)	40.6 (36.7)
Czech Republic	65	88.3	60.0	48.7
Denmark	74	110.3	80.2	76.2
Estonia	65	73.7	57.4	51.1
Finland	68	66.9	65.0	65.1
France	64	70.4	74.5	70.3
Germany	65	54.7	50.5	49.8
Greece	62	60.7	53.7	54.1
Hungary	65	89.6	89.6	89.6
Iceland	67	85.5	75.7	77.8
Ireland	68	70.0	42.3	32.4
Israel	67 (64)	100.4 (91.9)	75.1 (67.4)	54.9 (49.3)
Italy	71	93.0	93.2	93.8
Japan	65	52.6	40.0	35.3
Korea	65	63.8	45.1	33.7
Latvia	65	55.7	59.5	59.0
Luxembourg	60	98.3	88.4	83.6
Mexico	65	35.1	29.6 (27.7)	29.3 (27.5)
Netherlands	71	105.1	100.6	100.2

	Individual earnings, multiple of mean for men (women where different)			
	Pension age	0.5	1	1.5
OECD members (cont.)				
New Zealand	65	80.7	43.2	30.5
Norway	67	64.8	48.8	41.3
Poland	65 (60)	37.2 (35.3)	38.6 (34.1)	37.9 (33.8)
Portugal	68	92.9	94.9	93.1
Slovak Republic	68	85.0	83.8	83.5
Slovenia	60	57.3 (60.3)	56.7 (59.2)	54.1 (56.6)
Spain	65	79.3	81.8	81.7
Sweden	65	62.4	54.9	67.6
Switzerland	65 (64)	57.4 (56.8)	44.9 (44.5)	31.5 (31.2)
Turkey	61 (59)	99.1 (95.0)	102.1 (97.9)	105.8 (101.4)
United Kingdom	68	52.1	29.0	20.7
United States	67	59.9	49.1	42.4
OECD	**65.8 (65.5)**	**73.2 (72.7)**	**62.9 (62.2)**	**58.9 (58.2)**
Argentina	65 (60)	98.9 (90.3)	91.0 (83.1)	89.3 (81.3)
Brazil	55 (50)	92.4	76.4 (58.1)	76.4 (58.1)
China	60 (55)	104.4 (89.7)	83.0 (71.3)	77.0 (66.3)
India	58	99.3 (94.4)	99.3 (94.4)	99.3 (94.4)
Indonesia	65	65.4 (60.8)	65.5 (60.9)	66.1 (61.6)
Russian Federation	60 (55)	53.0 (47.2)	38.8 (32.9)	33.5 (27.7)
Saudi Arabia	45	65.4	65.4	65.4
South Africa	60	32.1	17.1	11.9
EU28	65.9 (65.5)	79.7 (79.6)	70.6 (70.4)	66.8 (66.6)

Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634002

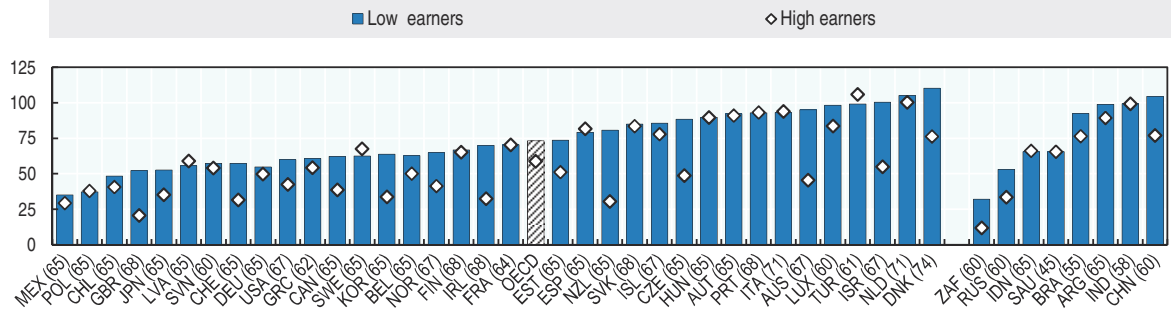
4.9. Net pension replacement rates: Average earners



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634021

4.10. Net pension replacement rates: Low and high earners



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634040

NET PENSION REPLACEMENT RATES: MANDATORY AND VOLUNTARY SCHEMES

Key results

The OECD average for net replacement rates of an average earner from public and mandatory private schemes is 63%. When voluntary private pensions, are added, the average net replacement rate is 69%. When voluntary private pensions are taken into account, for the eight OECD countries where voluntary private pensions are widespread the average net replacement rate for these eight countries is 74% compared with 62% in gross terms.

The personal tax system plays an important role in old-age support. Pensioners often do not pay social security contributions and, as personal income taxes are progressive and pension entitlements are usually lower than earnings before retirement, 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 treatment either to pension incomes or to pensioners, by giving additional allowances or credits to older people. Therefore, net replacement rates are usually higher than gross replacement rates.

For the 15 OECD countries where the calculations cover only public pensions, the net replacement rate for an average earner is 73% on average. For the 12 OECD countries with public and mandatory private provision, the average net replacement rate is 61%. In the eight countries where voluntary pensions are modelled the average net replacement rate reaches 74%.

For all 35 OECD countries, the average total – including public, mandatory private and voluntary private pensions – net replacement rate is 69%, against 59% in gross terms. Net replacement rates are thus on average over ten percentage points higher than the corresponding gross replacement rate figures.

For the other major economies, although there is a wide variation between country and across earnings level, there is a smaller difference between gross and net replacement rates as pensions are not normally liable for any taxation.

Mandatory private pensions

Twelve countries have mandatory private pensions, including a subset of three countries – Denmark, the Netherlands and Sweden – having private pensions that ensure near-universal coverage and so are described as "quasi-mandatory".

In Iceland, the Netherlands and Switzerland, private pensions are defined benefit while in the other countries they are defined contribution.

Voluntary private pensions

Replacement rates are shown for eight countries where voluntary private pensions are widespread (see the indicator of "Coverage of private pensions" in Chapter 8). For the other economies South Africa also has a significant voluntary scheme. It is assumed that workers with voluntary private pensions spend a full career in the scheme.

The rules that have been modelled are in the "Country Profiles" available at *http://oe.cd/pag*. In six of the eight countries, a defined contribution plan is modelled, with defined benefit schemes applying in Canada and Japan.

In general, both the defined contribution and defined benefit schemes pay a constant gross replacement rate with earnings. (Data on actual contribution rates by earnings are not available for most countries, and so an average or typical rate is assumed across the earnings range.) However, progressive tax rules mean that the net replacement rate differs across the earnings range. Whilst the increase in gross replacement rate is generally constant across earnings the net replacement rate tends to increase as the previous work earnings are taxed at much higher rates as individuals move up the earnings distribution.

Definition and measurement

The net replacement rate is defined as the individual net pension entitlement divided by net pre-retirement earnings, taking account of personal income taxes and social security contributions paid by workers and pensioners. Otherwise, the definition and measurement of the net replacement rates are the same as for the gross replacement rate. Details of the rules that national tax systems apply to pensioners can be found in the online Country Profiles available at *http://oe.cd/pag*.

4.11. Gross and net pension replacement rates from mandatory (public and private) and voluntary pension schemes

Percentage of individual earnings

	Gross mandatory public and private			Net mandatory public and private			Total gross with voluntary			Total net with voluntary		
	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5
Australia	82.8	32.2	32.1	95.0	42.6	45.4	82.8	32.2	32.1	95.0	42.6	45.4
Austria	78.4	78.4	78.4	92.2	91.8	90.9	78.4	78.4	78.4	92.2	91.8	90.9
Belgium	47.7	46.7	36.4	62.6	66.1	50.1	61.8	60.8	47.5	81.3	72.7	60.5
Canada	54.1	41.0	28.5	62.2	53.4	38.5	82.9	75.2	72.6	95.3	98.0	98.5
Chile	39.1	33.5	33.6	48.3	40.1	40.6	39.1	33.5	33.6	48.3	40.1	40.6
Czech Republic	74.1	45.8	36.4	88.3	60.0	48.7	74.1	45.8	36.4	88.3	60.0	48.7
Denmark	123.4	86.4	79.5	110.3	80.2	76.2	123.4	86.4	79.5	110.3	80.2	76.2
Estonia	62.0	49.7	45.6	73.7	57.4	51.1	62.0	49.7	45.6	73.7	57.4	51.1
Finland	56.6	56.6	56.6	66.9	65.0	65.1	56.6	56.6	56.6	66.9	65.0	65.1
France	60.5	60.5	54.8	70.4	74.5	70.3	60.5	60.5	54.8	70.4	74.5	70.3
Germany	38.2	38.2	38.2	54.7	50.5	49.8	50.9	50.9	50.9	66.5	65.4	64.6
Greece	67.4	53.7	49.2	60.7	53.7	54.1	67.4	53.7	49.2	60.7	53.7	54.1
Hungary	58.7	58.7	58.7	89.6	89.6	89.6	58.7	58.7	58.7	89.6	89.6	89.6
Iceland	77.6	69.0	67.9	85.5	75.7	77.8	77.6	69.0	67.9	85.5	75.7	77.8
Ireland	68.2	34.1	22.7	70.0	42.3	32.4	106.2	72.1	60.7	106.2	77.2	72.2
Israel	99.4	67.8	45.2	100.4	75.1	54.9	99.4	67.8	45.2	100.4	75.1	54.9
Italy	83.1	83.1	83.1	93.0	93.2	93.8	83.1	83.1	83.1	93.0	93.2	93.8
Japan	47.8	34.6	30.2	52.6	40.0	35.3	71.0	57.7	53.3	79.4	63.7	60.7
Korea	58.5	39.3	28.7	63.8	45.1	33.7	58.5	39.3	28.7	63.8	45.1	33.7
Latvia	47.5	47.5	47.5	55.7	59.5	59.0	47.5	47.5	47.5	55.7	59.5	59.0
Luxembourg	89.5	76.7	72.5	98.3	88.4	83.6	89.5	76.7	72.5	98.3	88.4	83.6
Mexico	34.7	26.4	25.1	35.1	29.6	29.3	34.7	26.4	25.1	35.1	29.6	29.3
Netherlands	98.1	96.9	96.5	105.1	100.6	100.2	98.1	96.9	96.5	105.1	100.6	100.2
New Zealand	80.0	40.0	26.7	80.7	43.2	30.5	98.8	58.8	45.4	100.8	63.5	51.8
Norway	63.6	45.1	36.5	64.8	48.8	41.3	63.6	45.1	36.5	64.8	48.8	41.3
Poland	31.6	31.6	31.6	37.2	38.6	37.9	31.6	31.6	31.6	37.2	38.6	37.9
Portugal	75.5	74.0	72.6	92.9	94.9	93.1	75.5	74.0	72.6	92.9	94.9	93.1
Slovak Republic	72.3	64.3	62.2	85.0	83.8	83.5	72.3	64.3	62.2	85.0	83.8	83.5
Slovenia	44.0	38.1	36.3	57.3	56.7	54.1	44.0	38.1	36.3	57.3	56.7	54.1
Spain	72.3	72.3	72.3	79.3	81.8	81.7	72.3	72.3	72.3	79.3	81.8	81.7
Sweden	55.8	55.8	64.5	62.4	54.9	67.6	55.8	55.8	64.5	62.4	54.9	67.6
Switzerland	56.0	42.1	28.5	57.4	44.9	31.5	56.0	42.1	28.5	57.4	44.9	31.5
Turkey	69.9	69.9	69.9	99.1	102.1	105.8	69.9	69.9	69.9	99.1	102.1	105.8
United Kingdom	44.3	22.1	14.8	52.1	29.0	20.7	74.3	52.2	44.8	83.7	62.2	55.6
United States	48.3	38.3	31.7	59.9	49.1	42.4	81.3	71.3	64.7	97.1	87.1	82.2
OECD	**64.6**	**52.9**	**48.4**	**73.2**	**62.9**	**58.9**	**70.3**	**58.7**	**54.4**	**79.4**	**69.1**	**65.9**
Argentina	81.7	71.6	68.2	98.9	91.0	89.3	81.7	71.6	68.2	98.9	91.0	89.3
Brazil	85.0	69.5	69.5	92.4	76.4	76.4	85.0	69.5	69.5	92.4	76.4	76.4
China	96.0	76.0	69.4	104.4	83.0	77.0	96.0	76.0	69.4	104.4	83.0	77.0
India	87.4	87.4	87.4	99.3	99.3	99.3	87.4	87.4	87.4	99.3	99.3	99.3
Indonesia	62.1	62.1	62.1	65.4	65.5	66.1	62.1	62.1	62.1	65.4	65.5	66.1
Russian Federation	46.1	33.7	29.1	53.0	38.8	33.5	46.1	33.7	29.1	53.0	38.8	33.5
Saudi Arabia	59.6	59.6	59.6	65.4	65.4	65.4	59.6	59.6	59.6	65.4	65.4	65.4
South Africa	32.1	16.0	10.7	32.1	17.1	11.9	48.8	48.8	48.8	48.8	52.0	54.3
EU28	69.6	58.3	54.5	79.7	70.6	66.8	73.0	61.7	57.8	83.2	73.8	70.4

Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634059

GROSS PENSION WEALTH

Key results

Pension wealth relative to individual earnings measures the total discounted value of the lifetime flow of all retirement incomes in mandatory pension schemes at retirement age. For average earners, pension wealth for men is 9.9 times and for women 10.9 times annual individual earnings on average in OECD countries. Gross pension wealth relative to annual individual earnings is higher for women because of their longer life expectancy. The main determinants of differences across countries are differences in the gross replacement rate, in the length of the retirement period measured by remaining life expectancy at the normal retirement age, and in indexation rules.

Replacement rates give an indication of the pension promise relative to individual earnings, but they are not comprehensive measures of cumulated pension payments; they look only at the benefit level relative to individual earnings at the point of retirement, or more generally at a given, later age. For a full picture, life expectancy, normal retirement age and indexation of pension benefits must also be taken into account. Together, these determine for how long the pension benefit is paid, and how its value evolves over time. Pension wealth – a measure of the stock of future discounted flows of pension benefits – takes account of these factors. It can be thought of as the lump-sum needed at the retirement age to buy an annuity giving the same flow of pension payments as that promised by mandatory retirement-income schemes.

In defined benefit systems there is often no or a weak link between the replacement rate and the expected duration of benefit withdrawal. However, in the long run, ensuring financial sustainability imposes a trade-off between the replacement rate and the duration of retirement. When retirement ages and pension benefits are held constant, pension wealth increases with longevity gains. In defined contribution systems there is a more direct link between the size of the benefit and the expected duration of benefit withdrawals. In these systems the pension wealth measure is equal to the accumulated assets and therefore independent of longevity increases as these automatically reduce the benefits.

Gross pension wealth at individual earnings equal to average worker earnings is highest in Luxembourg at 19.4 times annual individual earnings for men and 21.3 times for women. The lowest pension wealth for men is found in the United Kingdom and for women in Mexico at 4.4 and 4.7, respectively, due to low replacement rates.

Higher individual replacement rates mean that pension wealth relative to individual earnings tends to be higher for low earners than for average earners as well, at least as the estimations here abstract from differences in life expectancy across income levels. For men with individual earnings equal to half-average earnings, pension wealth is 12.1 times their earnings on average, compared with 9.9 times for average wage workers, and 13.4 and 10.9 times, respectively, for women. In the countries where pension wealth for low earners is highest (Australia, Israel, Luxembourg and New Zealand), its value is between 18 and 23 times individual earnings for men and slightly above at 19 to 25 times individual earnings for women.

Impact of life expectancy

In countries where the duration in retirement is shorter, such as Hungary, the Slovak Republic and Turkey, the individual pension wealth is smaller. The effect is the opposite in Switzerland and some of the Nordic countries, where life expectancy is high. Similarly, since women's life expectancy is longer than men's, pension wealth for women is higher in all countries that use unisex mortality tables or that have defined benefit systems. In addition, some countries still have lower retirement ages for women; this extends the payment period even further. Pension wealth is also affected by pension ages. A low retirement age in a defined benefit system such as in Luxembourg increases the pension wealth at a given level of benefit.

Impact of indexation

Pension wealth is affected by indexation rules at a given initial replacement rate level. Although most OECD countries now index pensions in payment to prices, there are exceptions: Germany, Ireland, Luxembourg and the United Kingdom, for example, link their, basic, defined benefit or point systems to average earnings. Since earnings tend to grow faster than prices pension wealth is higher with wage than price indexation, for a given level of replacement rate. If Luxembourg, for example, indexed to prices rather than wages, the pension wealth for an average male earner would decrease from 19.4 to 16.4 with unchanged initial benefit based on the OECD pension model.

For the non-OECD countries there is great variation with South Africa at only 4.7 and 5.8 times individual earnings for average earners for men and women compared with Brazil at 18.3 and 17.4 times individual earnings for men and women respectively.

Definition and measurement

The calculation of pension wealth uses a uniform real discount rate of 2%. Since the comparisons refer to prospective pension entitlements, the calculations use country-specific mortality rates by age and sex at the year of retirement. Pension wealth is expressed as a multiple of gross annual individual earnings.

4.12. Gross pension wealth by earnings

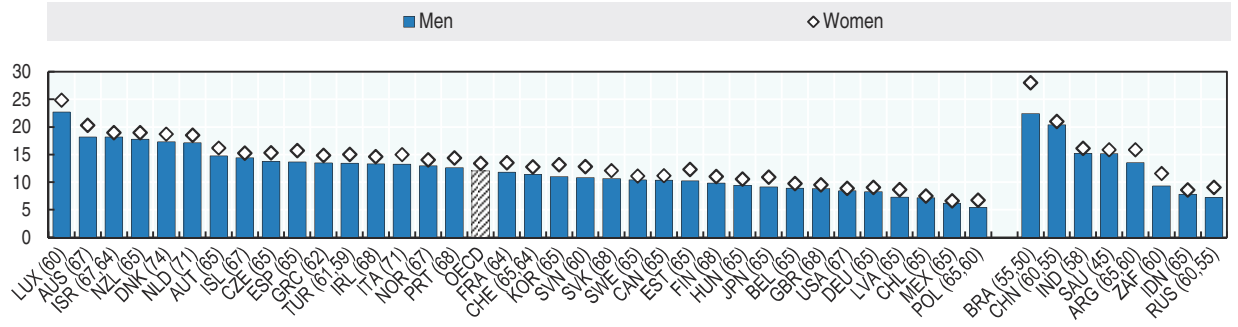
	Individual earnings, multiple of mean					
	0.5	1.0	1.5	0.5	1.0	1.5
OECD members	Men			Women		
Australia	18.2	11.2	9.0	20.3	12.3	9.6
Austria	14.8	14.8	14.8	16.2	16.2	16.2
Belgium	8.9	8.7	6.8	9.7	9.5	7.4
Canada	10.4	7.9	5.5	11.2	8.5	5.9
Chile	7.2	6.1	6.1	7.5	6.1	6.1
Czech Republic	13.8	8.5	6.8	15.3	9.5	7.5
Denmark	17.3	11.9	10.9	18.7	12.9	11.8
Estonia	10.2	8.2	7.5	12.3	9.9	9.1
Finland	9.8	9.8	9.8	11.1	11.1	11.1
France	11.8	11.8	10.7	13.5	13.5	12.2
Germany	8.3	8.3	8.3	9.0	9.0	9.0
Greece	13.5	10.8	9.9	14.8	11.8	10.8
Hungary	9.4	9.4	9.4	10.6	10.6	10.6
Iceland	14.4	12.6	12.4	15.3	13.3	13.1
Ireland	13.3	6.7	4.4	14.6	7.3	4.9
Israel	18.2	12.4	8.3	19.0	12.7	8.5
Italy	13.3	13.3	13.3	15.0	15.0	15.0
Japan	9.1	6.6	5.8	10.9	7.9	6.9
Korea	11.0	7.4	5.4	13.2	8.8	6.4
Latvia	7.3	7.3	7.3	8.6	8.6	8.6
Luxembourg	22.7	19.4	18.4	24.8	21.3	20.1
Mexico	6.2	4.7	4.5	6.6	4.7	4.5
Netherlands	17.1	16.9	16.8	18.5	18.3	18.2

	Individual earnings, multiple of mean					
	0.5	1.0	1.5	0.5	1.0	1.5
OECD members (cont.)	Men			Women		
New Zealand	17.8	8.9	5.9	19.0	9.5	6.3
Norway	13.0	9.1	7.3	14.0	9.9	7.9
Poland	5.4	5.4	5.4	6.7	6.3	6.3
Portugal	12.6	11.8	11.5	14.4	13.3	13.0
Slovak Republic	10.6	9.5	9.2	12.1	10.8	10.4
Slovenia	10.8	9.4	8.9	12.8	11.1	10.6
Spain	13.6	13.6	13.6	15.7	15.7	15.7
Sweden	10.4	10.4	12.2	11.1	11.1	13.0
Switzerland	11.4	8.5	5.8	12.8	9.6	6.5
Turkey	13.4	13.4	13.4	15.0	15.0	15.0
United Kingdom	8.9	4.4	3.0	9.5	4.8	3.2
United States	8.4	6.7	5.5	8.9	7.0	5.8
OECD	**12.1**	**9.9**	**9.0**	**13.4**	**10.9**	**9.9**
Argentina	13.6	11.9	11.3	15.9	13.8	13.1
Brazil	22.4	18.3	18.3	28.0	17.4	17.4
China	20.4	16.1	14.7	21.0	16.5	15.0
India	15.2	15.2	15.2	16.1	16.1	16.1
Indonesia	7.8	7.8	7.8	8.6	8.6	8.6
Russian Federation	7.2	5.3	4.6	9.0	6.3	5.3
Saudi Arabia	15.2	15.2	15.2	15.9	15.9	15.9
South Africa	9.3	4.7	3.1	11.6	5.8	3.9
EU28	12.6	10.5	9.8	14.0	11.7	10.9

Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634078

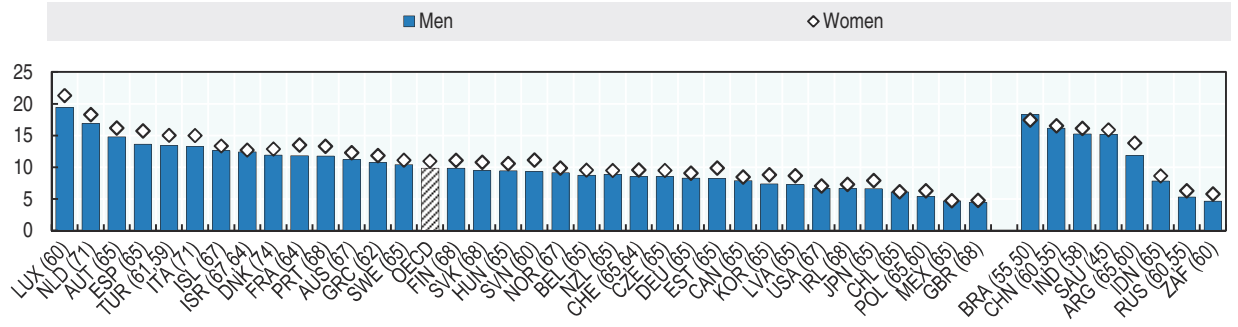
4.13. Gross pension wealth for lower earners by gender



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634097

4.14. Gross pension wealth for average earners by gender



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634116

NET PENSION WEALTH

Key results

As with gross pension wealth, net pension wealth relative to individual net earnings measures the total discounted value of the lifetime flow of all retirement incomes in mandatory pension schemes at retirement age. For average earners, net pension wealth for men is 11.8 times and for women 13.1 times annual individual net earnings on average in OECD countries. Net pension wealth relative to annual individual earnings is higher for women because of their longer life expectancy. The main determinants of differences across countries are differences in the net replacement rate, in the length of the retirement period measured by remaining life expectancy at the normal retirement age, and in indexation rules.

Replacement rates give an indication of the pension promise relative to individual earnings, but they are not comprehensive measures of cumulated pension payments; they look only at the benefit level relative to individual earnings at the point of retirement, or more generally at a given, later age. For a full picture, life expectancy, normal retirement age and indexation of pension benefits must also be taken into account. Together, these determine for how long the pension benefit is paid, and how its value evolves over time. Net pension wealth – a measure of the stock of future discounted flows of pension benefits after taxes and social contributions – takes account of these factors. It can be thought of as the total net benefits that will be received on average from the mandatory retirement-income schemes.

In defined benefit systems there is often no or a weak link between the replacement rate and the expected duration of benefit withdrawal. Of course, in the long run, ensuring financial sustainability imposes a trade-off between the replacement rate and the duration of retirement. When retirement ages and pension benefits are held constant, pension wealth increases with longevity gains. In defined contribution systems there is a more direct link between the size of the benefit and the expected duration of benefit withdrawals. In these systems the pension wealth measure is equal to the accumulated assets and therefore independent of longevity increases as these automatically reduce the benefits.

Net pension wealth at individual earnings equal to average worker earnings is highest in Luxembourg at 22.4 times annual individual net earnings for men and 24.5 times for women. The lowest pension wealth is found in Mexico at 5.3 times for both men and women, due to low replacement rates.

Higher individual replacement rates and the increased tax allowance for many pensioners mean that net pension wealth relative to individual net earnings tends to be higher for low earners than for average earners as well, at least as the estimations here abstract from differences in life expectancy across income levels. For men with individual earnings equal to half-average earnings, net pension wealth is 13.7 times their net earnings on average, compared with 11.8 times for average wage workers. Similarly, for women with low earnings, net pension wealth of 15.2 compares with 13.1 times individual earnings for average earners.

For higher earners net pension wealth is on average 10.9 for men and 12.1 for women, only slightly lower than that for average earners, with Luxembourg again highest and the United Kingdom lowest.

Impact of life expectancy

In countries where the duration in retirement is shorter and where pension benefits are defined benefit, such as Hungary, the Slovak Republic and Turkey, the individual pension wealth is smaller. The effect is the opposite in Switzerland and some of the Nordic countries (in DB systems), where life expectancies are high. Similarly, since women's life expectancy is longer than men's, pension wealth for women is higher in all countries that use unisex mortality tables or that have defined benefit systems. This is simply because in that case the same level of pension benefits can be expected to be paid over a longer retirement period. In addition, some countries still have lower retirement ages for women; this extends the payment period even further. Pension wealth is also affected by pension ages. A low retirement age in a defined benefit system such as in Luxembourg increases the pension wealth at a given level of benefit.

For the non-OECD countries there is great variation with South Africa at only 5.0 times individual earnings for average earners for men and 6.2 for women compared to 20.1 and 19.1 times individual earnings for men and women in Brazil.

Definition and measurement

Net pension wealth is the present value of the flow of pension benefits, taking account of the taxes and social security contributions that retirees have to pay on their pensions. It is measured and expressed as a multiple of net annual individual earnings in the respective country.

Taxes and contributions paid by pensioners are calculated conditional on the mandatory pension benefit to which individuals are entitled at different levels of earnings. The calculations take account of all standard tax allowances and tax reliefs as well as concessions granted either to pension income or to people of pension age.

Details of the rules that national tax systems apply to pensioners can be found in the online "Country Profiles" available at *http://oe.cd/pag*.

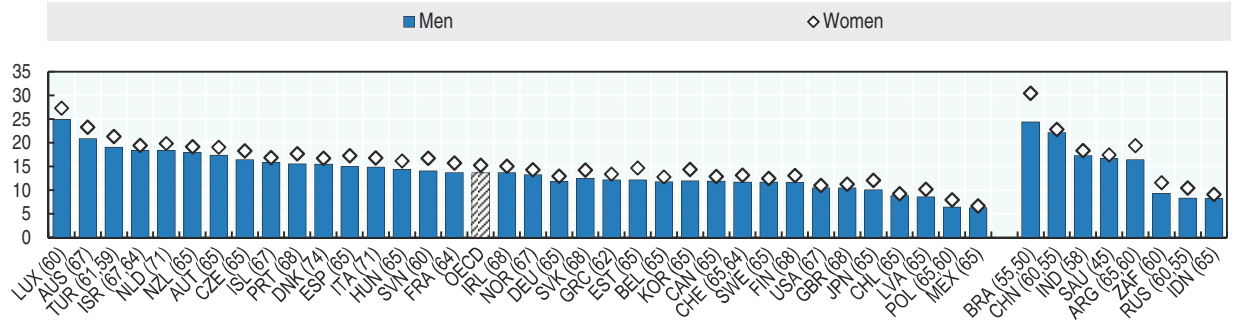
4.15. Net pension wealth by earnings

	Individual earnings, multiple of mean					
	0.5	1.0	1.5	0.5	1.0	1.5
OECD members		Men			Women	
Australia	20.9	14.8	12.7	23.3	16.2	13.6
Austria	17.4	17.3	17.1	19.0	19.0	18.8
Belgium	11.7	12.4	9.4	12.8	13.5	10.2
Canada	11.9	10.2	7.4	12.8	11.0	7.9
Chile	8.8	7.3	7.4	9.2	7.3	7.4
Czech Republic	16.4	11.1	9.0	18.3	12.4	10.1
Denmark	15.5	11.1	10.5	16.7	11.9	11.3
Estonia	12.2	9.5	8.4	14.6	11.4	10.2
Finland	11.6	11.3	11.3	13.1	12.7	12.7
France	13.7	14.5	13.7	15.7	16.6	15.7
Germany	11.8	10.9	10.8	12.9	12.0	11.8
Greece	12.2	10.8	10.9	13.4	11.8	11.9
Hungary	14.4	14.4	14.4	16.1	16.1	16.1
Iceland	15.9	13.9	14.2	16.8	14.7	15.0
Ireland	13.7	8.3	6.3	15.0	9.1	6.9
Israel	18.4	13.7	10.0	19.4	14.3	10.4
Italy	14.8	14.9	15.0	16.8	16.8	16.9
Japan	10.0	7.6	6.7	12.0	9.2	8.1
Korea	12.0	8.5	6.3	14.3	10.1	7.6
Latvia	8.5	9.1	9.1	10.1	10.8	10.7
Luxembourg	24.9	22.4	21.2	27.3	24.5	23.2
Mexico	6.3	5.3	5.2	6.7	5.3	5.2
Netherlands	18.4	17.6	17.5	19.8	19.0	18.9
New Zealand	17.9	9.6	6.8	19.1	10.2	7.2
Norway	13.2	9.9	8.3	14.3	10.7	9.0
Poland	6.4	6.6	6.5	7.9	7.7	7.6
Portugal	15.5	15.1	14.8	17.7	17.1	16.7
Slovak Republic	12.5	12.4	12.3	14.2	14.0	14.0
Slovenia	14.1	13.9	13.3	16.7	16.4	15.7
Spain	15.0	15.4	15.4	17.3	17.8	17.8
Sweden	11.7	10.3	12.8	12.4	10.9	13.6
Switzerland	11.7	9.1	6.4	13.1	10.2	7.1
Turkey	19.1	19.7	20.4	21.3	21.9	22.7
United Kingdom	10.5	5.8	4.1	11.2	6.2	4.4
United States	10.5	8.6	7.4	11.0	9.0	7.8
OECD	**13.7**	**11.8**	**10.9**	**15.2**	**13.1**	**12.1**
Argentina	16.4	15.1	14.8	19.4	17.8	17.4
Brazil	24.4	20.1	20.1	30.4	19.1	19.1
China	22.1	17.6	16.3	22.8	18.1	16.8
India	17.3	17.3	17.3	18.3	18.3	18.3
Indonesia	8.2	8.2	8.3	9.1	9.1	9.2
Russian Federation	8.3	6.1	5.2	10.4	7.3	6.1
Saudi Arabia	16.7	16.7	16.7	17.4	17.4	17.4
South Africa	9.3	5.0	3.5	11.6	6.2	4.3
EU28	14.5	12.7	12.0	16.1	14.2	13.4

Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634135

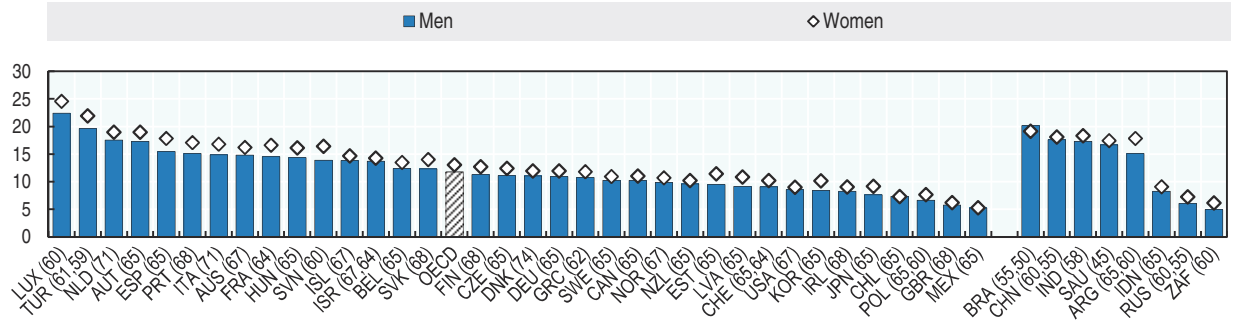
4.16. Net pension wealth for lower earners by gender



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634154

4.17. Net pension wealth for average earners by gender



Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634173

GROSS PENSION REPLACEMENT RATES FOR DIFFERENT EARNINGS PROFILES

Key results

The future gross replacement rate shown in indicator 4.2 for the average-wage worker assumes that this worker earns the average wage all along her or his career from age 20 (baseline case). The indicator here assumes a wage-age profile, with the relative wage increases until age 50. It computes the replacement rate assuming that over the whole career the average wage is the same as someone earning the average wage all along. Such a varying relative wage with age has little impact on replacement rates relative to the baseline case, with the average gross replacement rate remaining at 53%.

All the analysis in this publication, and in previous editions, concentrates solely on individuals at the same level of average earnings throughout their careers. This approach generates the results in Table 4.2, which are replicated here for comparison purposes in Table 4.18.

Remaining at the same relative earnings level throughout the career does not account for the fact that relative earnings typically start at a lower level and increase during the career before possibly lowering prior to retirement.

To ensure that the career average earnings remain the same between both cases as well as the final wage the earnings from age 60 onwards are at the average. Age 60 was chosen as this is the earliest long-term normal retirement age for men entering the labour market at age 20 in 2016 amongst OECD countries (Luxembourg and Slovenia).

Within the base case earnings remain at a constant proportion of average earnings whilst in the new earning profile the ratio of earnings relative to the average wage – which is still assumed to grow by 1.25% per year in real terms -increases linearly by about 50% (or more precisely 37 percentage points, corresponding to an increase in the ratio of an additional 1.25% per year) from age 20 to 50 before declining to the average level at age 60. The full profile is show in Figure 4.19 with a starting point around 80% of average earnings and peak earnings around 117% of the average. For low (high)-earners the earnings profile is also based on workers starting the career with 80%*0.5 (*1.5) of average earnings, recording a peak of 117%*0.5 (*1.5) of average earnings at age 50 before finishing the career from age 60 at 0.5 (1.5) average earnings.

As the career average earnings are constant across both in the base case and this earning profile scenario, the replacement rates in Ireland, New Zealand and the United Kingdom are also constant, as the benefit levels are effectively flat rate for full career workers.

On average across the OECD there is no difference in the replacement rates but there is some degree of country variation.

The four countries with the greatest variation in the replacement rate are France, Portugal, Slovenia and Spain. In all apart from Portugal, where the best 40 years are considered, only the last 25 years or best 24/25 years of earnings are used in the calculation of pension benefits. The average of earnings over the last 25 years is 7% above the average in the baseline scenario, hence explaining the higher replacement rates, although ceilings limit the increase in France for average and high earners.

Going in the opposite direction the replacement rates fall most in Denmark as the contributions made at the start of the career to the defined contribution system will have lower value than for an average earner. Although there will be years of contributions at higher than average earnings later in the career they will not completely offset this loss.

In Austria the replacement rates for the highest earners are nearly three percentage points lower than in the base case, as there is a ceiling to contributions which is applicable for the earnings profile cases, thereby reducing the final pension amount. A ceiling also applies in Belgium for average and high earners.

Definition and measurement

The old-age pension replacement rate measures how effectively a pension system provides a retirement income to replace earnings, the main source of income before retirement. The gross replacement rate is defined as gross pension entitlement divided by gross pre-retirement earnings.

Often, the replacement rate is expressed as the ratio of the pension to final earnings (just before retirement). Under the baseline assumptions, workers earn the same percentage of average worker earnings throughout their career. Therefore, final earnings are equal to lifetime average earnings revalued in line with economy-wide earnings growth. Replacement rates expressed as a percentage of final earnings are thus identical to those expressed as a percentage of lifetime earnings. However, if people move up the earnings distribution as they get older, then their earnings just before retirement will be higher than they were on average over their lifetime average earnings are lower than their earnings just before retirement. Total pension entitlements, and therefore pension benefits, are therefore lower than if they had spent the whole career at the final wage.

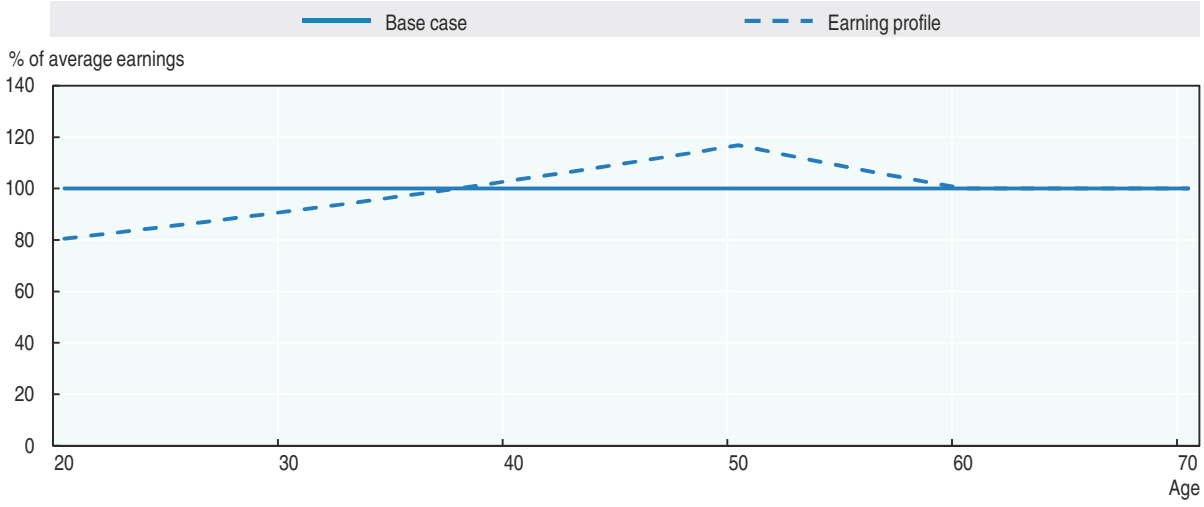
4.18. Gross pension replacement rates for men by earnings

	Base case			Earnings profile				Base case			Earnings profile		
	0.5	1	1.5	0.5	1	1.5		0.5	1	1.5	0.5	1	1.5
Australia	82.8	32.2	32.1	82.2	32.0	31.7	Korea	58.5	39.3	28.7	58.4	39.1	28.7
Austria	78.4	78.4	78.4	77.8	77.8	75.7	Latvia	47.5	47.5	47.5	47.0	47.0	47.0
Belgium	49.1	48.1	37.6	48.5	46.8	36.4	Luxembourg	89.5	76.7	72.5	89.0	76.3	72.0
Canada	54.1	41.0	28.5	53.9	40.3	28.5	Mexico	34.7	26.4	25.1	34.7	26.0	24.6
Chile	39.1	33.5	33.6	38.6	32.7	32.8	Netherlands	98.1	96.9	96.5	97.3	96.1	95.6
Czech Republic	74.1	45.8	36.4	73.8	45.7	36.3	New Zealand	80.0	40.0	26.7	80.0	40.0	26.7
Denmark	123.4	86.4	79.5	122.4	84.9	78.0	Norway	63.6	45.1	36.5	63.3	44.6	36.3
Estonia	62.0	49.7	45.6	61.4	49.1	45.0	Poland	31.6	31.6	31.6	31.6	31.6	31.6
Finland	56.6	56.6	56.6	56.2	56.2	56.2	Portugal	75.5	74.0	72.6	77.2	75.6	74.3
France	60.5	60.5	54.8	63.7	62.3	55.4	Slovak Republic	72.3	64.3	62.2	71.6	63.7	61.6
Germany	45.5	38.2	38.2	45.5	37.9	37.1	Slovenia	44.0	38.1	36.3	46.9	40.6	38.6
Greece	67.4	53.7	49.2	67.0	53.4	48.9	Spain	72.3	72.3	72.3	76.3	76.3	75.5
Hungary	58.7	58.7	58.7	58.2	58.2	58.2	Sweden	55.8	55.8	64.5	55.3	56.1	64.7
Iceland	77.6	69.0	67.9	77.3	68.4	67.4	Switzerland	56.0	42.1	28.5	55.6	42.2	28.5
Ireland	68.2	34.1	22.7	68.2	34.1	22.7	Turkey	69.9	69.9	69.9	68.7	68.7	68.7
Israel	99.4	67.8	45.2	98.0	67.8	45.2	United Kingdom	44.3	22.1	14.8	44.3	22.1	14.8
Italy	83.1	83.1	83.1	82.8	82.8	82.8	United States	48.3	38.3	31.7	48.8	38.8	32.0
Japan	47.8	34.6	30.2	47.6	34.4	30.0	**OECD**	**64.9**	**52.9**	**48.4**	**65.0**	**53.0**	**48.6**

Source: OECD pension models.

StatLink http://dx.doi.org/10.1787/888933634192

4.19. Earnings profile compared to base case



StatLink http://dx.doi.org/10.1787/888933634211

Pensions at a Glance 2017
OECD and G20 Indicators

Chapter 5

Demographic and economic context

Population ageing has been one of the main driving forces behind changes in pension policies and reforms. Ageing is the result of two demographic changes.

The first indicator looks into the number of births and the development over the last 50 years. The second driver of population ageing is increasing life expectancy. Changes in life expectancy – at birth and at age 65 – are shown as the second indicator. There is also a brief discussion about how this might change in the future. The third indicators looks into the degree of ageing measured as the demographic dependency ratio. The number of people aged 65 and above relative to the number of people of working age. The fourth indicator takes a look at the employment rates of older works. The fifth indicator presents calculations for the age that people leave the labour market – the "Effective age of labour market exit". The last indicator measures the expected years following labour market exit by combining life expectancy with the previous indicator.

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.

FERTILITY

Key results

The total fertility rate is below the estimated replacement level of about 2.1 in developed countries – the number of children needed to keep the total population constant – in 33 out of 35 OECD countries in 2015. The exceptions to this are Israel with a total fertility rate of 2.93 and Mexico at 2.14. In over two-thirds of OECD countries fertility rates have slightly increased since the early 2000s. Fertility rates have a profound implication for pension systems because they, along with life expectancy, are the drivers of population ageing. Since 1960, there has been a steady convergence of fertility rates across countries, which is expected to be prolonged in the next decades.

Fertility rates averaged 1.71 across OECD countries in 2015, well below the level that ensures population replacement. The trend to fewer children has been going on since the late 1950s, but stopped around the turn of century on average. The fall in fertility rates reflected changes in individuals' lifestyle preferences, in family formation, and in the constraints of everyday living, such as those driven by labour-market insecurity, difficulties in finding suitable housing and unaffordable childcare.

The positive (and widening) gap between the number of children women declare that they want and the number that they actually have shows at least in part the influence of these constraints.

Another effect might come from changes in women's aspiration regarding partnership and childbearing norms, especially in countries such as Japan and Korea where there is a strong link between marriage and maternity. However, the childbearing patterns of unmarried men and women have also changed. For example, half or more of births now occur outside of marriage in France, Iceland, Norway and Sweden. The average proportion of births outside marriage in OECD countries is now one-third of the total.

Over the last 50 years there has been a steady convergence in fertility rates across OECD countries. In 1960, both Mexico and Turkey had rates around twice the OECD average, with Hungary and Latvia not much over half, and an overall standard deviation of 1.2. This latter figure has decreased considerably over time, falling to 0.3 by 2015 and forecast to be only 0.1 by 2060.

Since 2000, on average there has been a very slight increase in fertility rates across the OECD. However, this increase has been substantially higher in a few countries, reaching 0.4 in both the Czech Republic and Slovenia, and 0.3 in Estonia and Latvia.

This recent increase in fertility rates is forecast to continue, albeit very slowly, and the average rate will be 1.80 across OECD countries by 2060 according to United Nations Population Prospects.

Low fertility rates have wider social and economic consequences. First, the decline in population can become self-reinforcing, with fertility rates going below 2.1, as the number of women of childbearing age falls by each generation. Secondly, the old-age dependency ratio will increase sharply placing additional burdens on the working age population to finance pensions and health care for older people. Finally, the workforce will also age over time and so might be less adaptable to technological change, thereby reducing productivity and economic growth.

Among the other major economies, Argentina, India, Indonesia, Saudi Arabia and South Africa all currently have fertility rates well above the replacement level of 2.1. Nevertheless, the forecast is that fertility rates will go below natural replacement rate by 2030.

Definition and measurement

The total fertility rate is the number of children that would be born to each woman if she were to live to the end of her child-bearing years and if the likelihood of her giving birth to children at each age was the currently prevailing age-specific fertility rates. It is generally computed by summing up the age-specific fertility rates defined over a five-year interval. A total fertility rate of 2.1 children per women – the replacement level – ensures broad stability of the population, on the assumptions of no migration flows and unchanged mortality rates.

Further reading

d'Addio, A.C. and M. Mira d'Ercole (2005), "Trends and Determinants of Fertility Rates: The Role of Policies", *OECD Social, Employment and Migration Working Papers*, No. 27, OECD Publishing, Paris, *http://dx.doi.org/10.1787/880242325663*.

5.1. Total fertility rates, 1960-2060

	1960	1970	1980	1990	2000	2010	2015	2030	2060
OECD members									
Australia	3.27	2.54	1.91	1.86	1.77	1.89	1.83	1.77	1.77
Austria	2.78	2.04	1.60	1.48	1.38	1.45	1.51	1.63	1.75
Belgium	2.65	2.01	1.60	1.61	1.68	1.78	1.80	1.83	1.86
Canada	3.68	1.98	1.63	1.69	1.52	1.61	1.56	1.60	1.72
Chile	4.95	3.58	2.70	2.43	2.03	1.82	1.76	1.72	1.76
Czech Republic	2.21	2.21	1.97	1.65	1.19	1.48	1.57	1.72	1.82
Denmark	2.58	1.96	1.43	1.75	1.76	1.73	1.76	1.81	1.85
Estonia	1.94	2.15	2.09	1.63	1.39	1.59	1.66	1.77	1.83
Finland	2.66	1.62	1.69	1.82	1.75	1.77	1.78	1.80	1.83
France	2.83	2.30	1.87	1.71	1.88	1.98	1.97	1.96	1.95
Germany	2.47	1.71	1.46	1.30	1.35	1.43	1.47	1.57	1.68
Greece	2.29	2.53	2.06	1.42	1.33	1.34	1.30	1.43	1.66
Hungary	1.81	2.04	1.81	1.74	1.30	1.33	1.40	1.53	1.67
Iceland	3.94	2.87	2.23	2.19	1.99	1.98	1.92	1.82	1.78
Ireland	4.07	3.82	2.76	1.91	1.97	2.00	1.98	1.95	1.93
Israel	3.85	3.81	3.13	2.93	2.91	3.04	2.92	2.61	2.17
Italy	2.50	2.32	1.52	1.27	1.30	1.43	1.49	1.62	1.74
Japan	2.03	2.13	1.76	1.48	1.30	1.41	1.48	1.62	1.74
Korea	5.60	4.00	2.23	1.68	1.21	1.23	1.32	1.52	1.70
Latvia	1.88	2.00	2.03	1.63	1.29	1.50	1.57	1.70	1.80
Luxembourg	2.40	1.72	1.47	1.66	1.65	1.55	1.59	1.68	1.76
Mexico	6.75	6.71	4.37	3.23	2.61	2.29	2.14	1.81	1.72
Netherlands	3.17	2.10	1.51	1.59	1.74	1.73	1.75	1.79	1.82
New Zealand	3.85	2.84	1.97	2.07	1.95	2.04	1.97	1.85	1.79
Norway	2.90	2.35	1.69	1.89	1.81	1.82	1.83	1.84	1.86
Poland	2.72	2.23	2.31	1.95	1.26	1.33	1.29	1.41	1.65
Portugal	3.19	2.83	2.01	1.48	1.45	1.28	1.24	1.38	1.64
Slovak Republic	2.91	2.51	2.27	1.87	1.22	1.39	1.46	1.61	1.74
Slovenia	2.34	2.20	1.93	1.33	1.21	1.58	1.64	1.75	1.83
Spain	2.81	2.85	1.88	1.28	1.29	1.33	1.39	1.52	1.66
Sweden	2.31	1.91	1.64	2.01	1.67	1.90	1.91	1.92	1.93
Switzerland	2.60	1.87	1.54	1.54	1.41	1.53	1.55	1.60	1.67
Turkey	6.20	5.39	4.11	2.90	2.37	2.12	2.02	1.83	1.74
United Kingdom	2.81	2.01	1.78	1.78	1.66	1.88	1.87	1.86	1.86
United States	3.23	2.03	1.80	2.03	2.04	1.88	1.89	1.90	1.92
OECD	**3.15**	**2.60**	**2.05**	**1.82**	**1.65**	**1.70**	**1.70**	**1.74**	**1.79**
Argentina	3.09	3.15	3.15	2.90	2.52	2.35	2.27	2.07	1.86
Brazil	6.00	4.68	3.82	2.72	2.13	1.78	1.70	1.61	1.68
China	6.20	4.77	2.55	1.90	1.55	1.60	1.63	1.71	1.77
India	5.89	5.41	4.68	3.83	3.14	2.44	2.30	2.02	1.79
Indonesia	5.62	5.30	4.11	2.90	2.53	2.45	2.32	2.04	1.84
Russian Federation	2.55	2.03	2.04	1.55	1.30	1.70	1.75	1.84	1.89
Saudi Arabia	7.26	7.30	7.02	5.55	3.65	2.73	2.48	2.02	1.71
South Africa	6.00	5.50	4.60	3.34	2.75	2.55	2.41	2.11	1.84
EU28	2.60	2.24	1.90	1.66	1.47	1.56	1.59	1.68	1.78

Source: United Nations, *World Population Prospects – 2017 Revision.*

StatLink http://dx.doi.org/10.1787/888933634230

LIFE EXPECTANCY

Key results

The remarkable increase in life expectancy is one of the greatest achievements of the last century. Lives continue to get longer, and this trend is predicted to continue. In 2015-20, life expectancy at birth averaged 78.3 years for men and 83.4 years for women. Among women, the figure was highest in Japan (87.2 years) and lowest in Turkey (79.3 years). For men, life expectancy at birth was highest in Iceland (81.6 years) and lowest in Latvia (69.7 years). On average across OECD countries, remaining life expectancy at age 65 is projected to increase by 4.2 years among women and 4.6 years among men during the next 45 years.

Life expectancy at older ages is especially important for wellbeing. However, it also influences the finances of retirement-income systems. In 2015-20, on average in OECD countries, women aged 65 could expect to live an additional 21.3 years, which is forecast to increase to 25.5 years by 2060-65. Men of the same age could expect to live 18.2 more years in 2015-20, with a projected increase of 4.5 years by 2060-65 to reach 22.8 years. Gender gaps in the longevity of older people are expected to decrease slightly over the next 45 years (from 3.1 to 2.7 years on average in OECD countries).

There is considerable variation between OECD countries in life expectancy at older ages. Women in Japan are predicted to live another 29.0 years on reaching age 65 in 2060-65, followed by Korea (28.1 years). In contrast, women in Hungary are expected to live an extra 22.3 years and 22.4 years in Latvia.

For men there is less variation between countries than there is for women. Israel will have the longest life expectancy at age 65 in 2060-65 (24.2 years), followed by Iceland and Switzerland (24.1 years). By contrast, Latvia and Hungary are again ranked at the bottom with men expecting to live just another 18.3 years and 19.3 years respectively.

The gender gap in life-expectancy at age 65 is predicted to be between two and four years in favour of women in nearly all OECD countries in 206065. Larger gender gaps of around five years are observed in both Japan and Korea. The smallest gender gap, at 1.5 years will be found in Iceland, with New Zealand and the United Kingdom at 1.6 years.

Given this trend, many OECD countries have increased or plan to increase their pension benefit withdrawal ages: see Chapter 1 on "Recent Pension Reforms". Others have introduced elements into their retirement-income provision that will automatically adjust the level of pensions as people live longer. Overall longevity gains are due to rising living standards, but also greater access to quality health services.

Turning to the non-OECD major economies, life expectancy is generally lower. Life expectancy at birth is by far the lowest in South Africa at 60.2 years for men and 67.2 years for women. The highest life expectancy at birth is found in Argentina for women at 80.5 years and in China at 75.0 years for men. Life expectancy at 65 is the lowest for Indonesian women (at 14.4 years) and for South African men at 11.5 years. By 2060-65 those aged 65 will live longest in Brazil at 24.4 years for women and 21.2 years for men. Conversely men will only live for 14.4 years and women for 17.7 years in South Africa.

The above numbers refer to period life expectancy, which measures life expectancy at a given time (2015-20 or 2060-65 here) based on mortality rates (current or projected) at that time for people of different ages, and hence belonging to different birth cohorts. By contrast, cohort life expectancy is based on the projected mortality rates that would apply to the same birth cohort at different ages. It thus takes account of continuing improvements (after 2015-20 or 2060-65) that would benefit a given birth cohort. On average these cohort estimates add 1.5 years for women aged 65 in 2060-65 and 1.1 years for men.

Definition and measurement

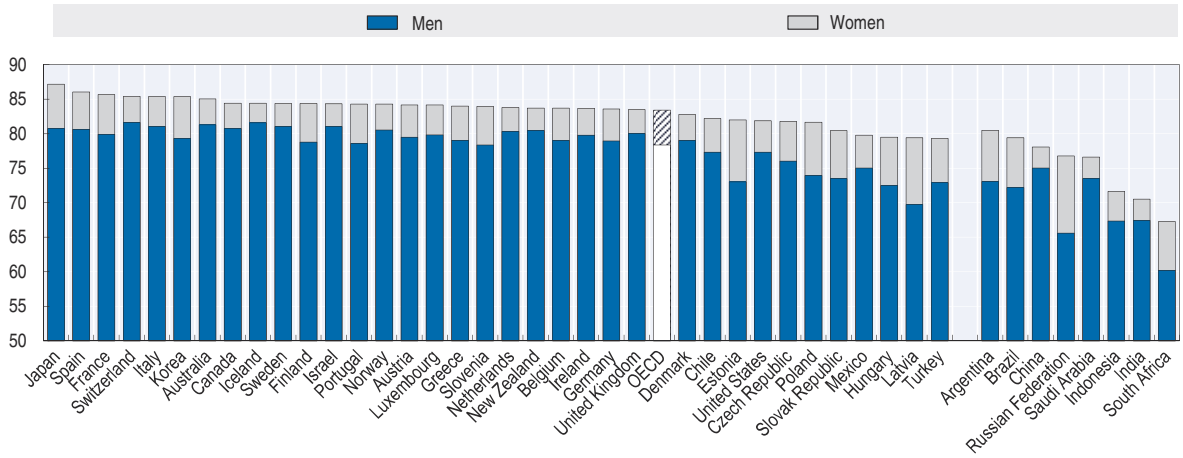
Life expectancy is defined as the average number of years that people of a particular age could expect to live if they experienced the ageand sex-specific mortality rates prevalent in a given country in a particular year: in this case, 2015-20 and 2060-65. Since the determinants of longevity change slowly, life expectancy is best analysed over a long time horizon. Cohort life expectancy takes account of the projected changes in mortality estimates for a given cohort.

Further reading

OECD (2017), *Preventing Ageing Unequally*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/231747416062*.

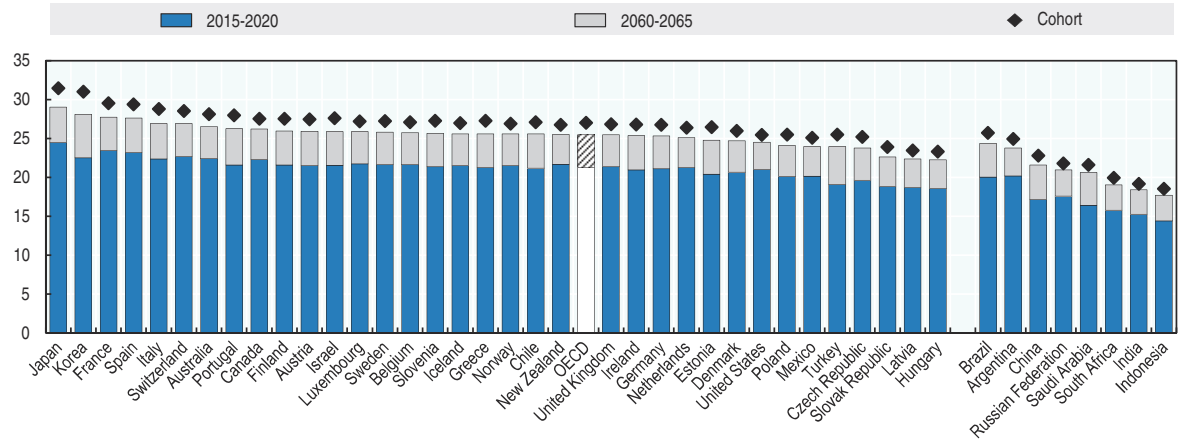
Whitehouse, E.R. (2007), "Life-expectancy Risk and Pensions: Who Bears the Burden?", *OECD Social, Employment and Migration Working Paper No. 60*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/060025254440*.

5.2. Life expectancy at birth, in years, men and women, born in 2015-20



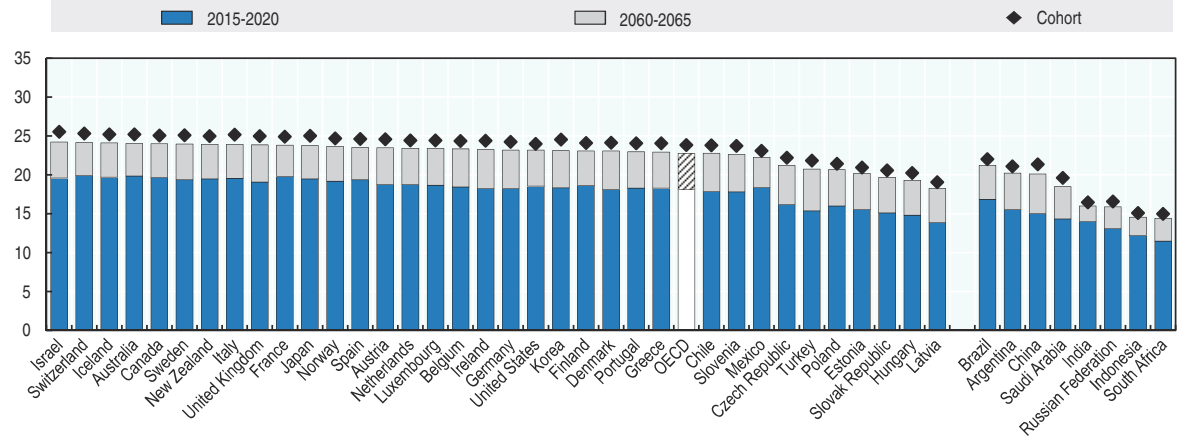
StatLink http://dx.doi.org/10.1787/888933634249

5.3. Expected remaining life expectancy at age 65, in years for women in 2015-20 and 2060-65



StatLink http://dx.doi.org/10.1787/888933634268

5.4. Expected remaining life expectancy at age 65, in years for men in 2010-15 and 2060-65



Source: United Nations, *World Population Prospects – 2017 Revision.*

StatLink http://dx.doi.org/10.1787/888933634287

OLD-AGE DEPENDENCY RATIO

Key results

The so-called demographic old-age dependency ratio – computed by keeping age thresholds constant – will more than double by 2075. Population ageing has been one of the main driving forces behind the wave of pension reforms in recent years. In 2015, there were 28 individuals aged 65 and over for every 100 persons of working age (ages 20 to 64) on average across all OECD countries. The old-age dependency ratio was equal to 14 in 2050, and it is expected to double again in less than 50 years, reaching 58 in 2075.

In 2015, the demographically oldest OECD country was Japan, with a dependency ratio equal to 47 (meaning 47 individuals aged 65 and over for 100 persons of working age). Finland, Greece and Italy also had high dependency ratios, between 35 and 38. By 2075 the dependency ratio is expected to reach 79 in Korea, 76 in Japan, 75 in Portugal and 73 in Greece.

By contrast, Mexico and Turkey are the youngest countries, with dependency ratios of 11 and 13 respectively, followed by Chile, at 18. By 2075, the dependency ratio would be much larger than the OECD average in Chile (69 compared to 58) and close to the average in Mexico and Turkey (55 and 54, respectively).

Four of the five main English-speaking OECD countries – Australia, Canada, Ireland and the United States – have relatively low dependency ratios, between 22 and 26. This is partly due to inward migration of workers. Ireland and the United States, both with large immigrant populations, have fertility rates currently just below replacement level. Other countries that currently have a younger population are Iceland and the Slovak Republic, with dependency ratios of 23 and 21, respectively. As both countries will age quickly, their dependency ratio will be very close to the OECD average by 2075. Poland will age even more rapidly, going from 24 to 70 over the same time period.

The evolution of dependency ratios depends on mortality rates, fertility rates and migration. OECD countries have seen prolonged increases in life expectancy, which most analysts project to continue, implying an increasing number of older people and most likely of pensioners too.

There have also been substantial declines in fertility, which, of course, will eventually diminish the number of workers entering the labour market. For example, fertility rates fell below the replacement level on average in OECD countries around 1980, implying shrinking generations. In the future, however, there is a great deal of uncertainty over how fertility rates will evolve.

For the OECD as a whole, the increase in the dependency ratio is projected to continue. There is, however, an assumed convergence among OECD countries, with demographically younger countries ageing more rapidly.

By far Korea is expected to record the most rapid population ageing among OECD countries. The dependency ratio would increase from 6 in 1950 to 79 by 2075 and Korea will move from being the fourth youngest country in the OECD in 2015 to the oldest in 2075.

The pattern for the EU28 broadly follows the OECD average. European countries are already slightly older than the OECD average: a dependency ratio of 30 for the EU28 in 2015 compares with an OECD figure of 28. By 2075, the dependency ratio for the European Union is also projected to reach 58.

All of the other non-OECD major economies have dependency ratios below the OECD average. However, many will face rapid population ageing in the coming decades. In Brazil and China, for example, the dependency ratio will increase from around 13 and 14 currently to 62 and 66 in 2075, respectively. By the end of the projection horizon, South Africa will be youngest country, demographically very close to the OECD average today, with a dependency ratio of 29, followed by Indonesia at 31.

Definition and measurement

The demographic old-age dependency ratio is defined as the number of individuals aged 65 and over per 100 people of working age defined as those aged between 20 and 64.

The projections for old-age dependency ratios used here are based on the most recent "medium-variant" population projections. They are drawn from the United Nation, *World Population Prospects – 2017 Revision*.

5.5. Demographic old-age dependency ratios: Historical and projected values, 1950-2075

	1950	1975	2000	2015	2025	2050	2075
OECD members							
Australia	14.0	16.0	20.6	25.0	31.2	41.2	48.4
Austria	17.3	27.1	24.9	30.5	37.1	59.4	63.1
Belgium	18.1	25.2	28.3	30.6	37.1	51.0	54.0
Canada	14.0	15.4	20.5	26.1	36.2	48.1	54.5
Chile	8.6	11.3	13.1	17.0	23.6	43.0	61.2
Czech Republic	13.9	22.7	21.9	28.8	37.1	58.9	55.6
Denmark	15.6	23.7	24.2	33.0	37.7	45.3	53.4
Estonia	19.3	21.2	25.0	31.0	39.2	56.3	59.0
Finland	11.9	18.1	24.8	35.0	44.0	48.8	54.7
France	19.5	24.5	27.3	33.3	40.9	52.3	55.8
Germany	16.2	26.5	26.5	34.8	41.4	59.2	63.1
Greece	12.4	20.9	26.7	33.0	39.2	73.4	75.2
Hungary	13.2	21.3	24.5	27.9	36.6	52.4	57.6
Iceland	14.1	18.1	20.2	23.1	31.5	45.7	58.4
Ireland	20.9	21.4	18.0	22.3	29.0	49.9	50.9
Israel	7.1	15.2	18.8	21.1	25.2	32.1	39.4
Italy	14.3	21.6	29.2	37.8	45.6	72.4	67.0
Japan	9.9	12.7	27.3	46.2	54.4	77.8	75.3
Korea	6.3	8.2	11.2	19.4	31.7	72.4	78.8
Latvia	18.1	21.9	25.1	31.5	39.0	52.3	52.0
Luxembourg	15.8	22.6	22.9	22.0	26.4	42.0	47.1
Mexico	7.9	9.6	10.0	11.4	14.8	32.2	53.7
Netherlands	13.9	19.3	21.9	30.2	39.0	53.0	59.7
New Zealand	16.3	16.9	20.3	25.1	32.5	43.6	54.5
Norway	16.0	24.9	25.9	27.4	32.5	43.1	51.2
Poland	9.4	17.1	20.1	24.3	36.4	60.8	73.3
Portugal	13.0	19.6	26.8	34.6	42.4	73.2	77.6
Slovak Republic	11.9	18.3	18.6	21.5	31.4	53.9	58.0
Slovenia	12.5	19.0	22.4	28.8	41.1	66.8	60.2
Spain	12.8	19.0	26.9	30.6	38.6	77.5	70.4
Sweden	16.8	26.3	29.5	33.8	38.2	45.5	51.6
Switzerland	15.8	21.5	24.9	29.0	35.4	54.6	58.1
Turkey	6.5	10.0	11.4	13.4	17.3	36.2	54.8
United Kingdom	17.9	25.5	27.0	31.0	35.9	48.0	53.0
United States	14.2	19.7	20.9	24.6	32.9	40.3	49.3
OECD	**13.9**	**19.5**	**22.5**	**27.9**	**35.2**	**53.2**	**58.6**
Argentina	7.5	14.1	18.6	19.5	21.8	31.8	44.6
Brazil	6.5	8.0	9.3	13.0	18.3	40.1	62.3
China	8.5	8.8	11.4	14.5	22.3	47.9	58.8
India	6.4	7.6	8.7	10.0	12.7	22.0	37.0
Indonesia	8.6	7.9	8.7	8.7	11.6	23.1	32.5
Russian Federation	8.7	15.5	20.4	20.7	30.1	40.0	37.6
Saudi Arabia	7.5	7.6	6.1	4.8	7.5	27.4	40.6
South Africa	8.5	8.1	7.8	9.0	11.1	17.8	29.0
EU28	14.7	21.2	24.3	29.9	37.5	55.9	59.7

Note: The demographic old-age dependency ratio is defined as the number of individuals aged 65 and over per 100 people of working age defined as those aged between 20 and 64.
Source: United Nations, *World Population Prospects – 2017 Revision*.

StatLink http://dx.doi.org/10.1787/888933634306

EMPLOYMENT RATES OF OLDER WORKERS

Key results

The employment rate falls with age in all OECD countries. For individuals aged 55 to 59 years, the average employment rate across all OECD countries was 69.6% in 2016, 46.3% for the 60 to 64 age group and 20.9% for those aged 65 to 69. In twelve OECD countries the employment rates were above the OECD average for all age groups aged 55 and over; by contrast it was below average for all age groups in ten OECD countries. Employment rates of people aged 55 to 64 have improved since the start of the century in most OECD countries, from 44.0% in 2000 to 58.4% in 2016.

There are large cross-country variations in the employment rates of people aged 55 to 69 in the OECD. In 2016, Iceland displayed the highest rates at 86% for those aged 55 to 59 and at 83% for individuals aged between 60 and 64. Employment rates of individuals aged 65 to 69 were 56%. By contrast the lowest employment rates were found in Greece and Turkey where employment rates for people aged 55 to 59 were 47% and 38%, respectively.

In Denmark, Finland and Germany the employment rates are well above the OECD average (69.6%) for individuals aged 55 to 59 at around 7581%. However, they fall quickly with age and are below the OECD average for individuals aged between 65 and 69. In France the employment rates are close to the OECD average for the 55 to 59 age group, but they fall steeply and are well below the average for the over 60s. In contrast, the employment rates in Mexico are below the OECD average for the 55 to 59 year-olds but above average in the age-groups 60 to 64 and 65 to 69.

In a large number of European OECD countries the employment rates are below the OECD average for all age groups considered: Austria, Belgium, Greece, Italy, Luxembourg, Poland, Portugal, Slovenia, Spain and Turkey.

Employment rates of people aged between 55 and 64 have improved in most OECD countries since the year 2000. On average, they have increased by 14 percentage points passing from 44.0% in 2000 to 58.4% in 2016. By comparison the employment rates among the 25 to 54 age group increased from 76.8% in 2000 to 79.5% in 2016. The greatest increase for the 55-to-64 age group occurred in Germany from a relatively low level of 38% in 2000 to 69% in 2014. Mainly as a result of the economic crisis, in Greece and Turkey, the employment rates of the 55-64s declined between 2000 and 2016.

Definition and measurement

Employment rates are defined as a measure of the extent to which available labour resources (people available to work) are being used. They are calculated as the ratio of the employed to the total population. Employed people are those aged 15 or over who report that they have worked in gainful employment for at least one hour in the previous week or who had a job but were absent from work during the reference week.

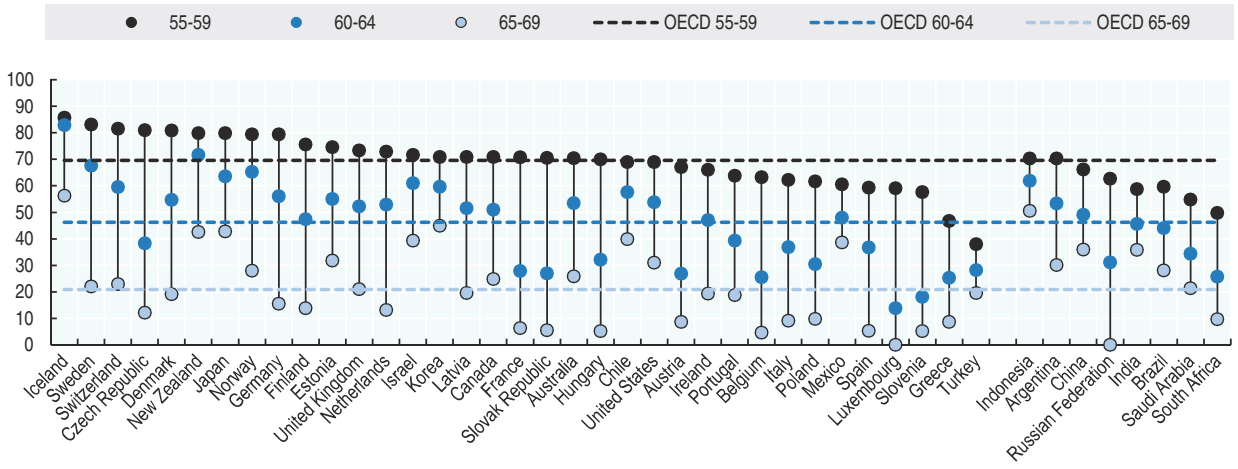
Further reading

OECD review on Ageing and Employment Policies: *Working Better with Age* reports on Denmark, France, Netherlands, Norway, Poland and Switzerland (see *www.oecd.org/els/employment/olderworkers*).

OECD (2017), *OECD Employment Outlook 2017* OECD Publishing, Paris, *http://dx.doi.org/10.1787/empl_outlook-2017-en*.

Sonnet, A., H. Olsen and T. Manfredi (2014), "Towards More Inclusive Ageing and Employment Policies: The Lessons from France, the Netherlands, Norway and Switzerland", *De Economist*, Vol. 162, December.

5.6. Employment rates of workers aged 55-59, 60-64 and 65-69 in 2016

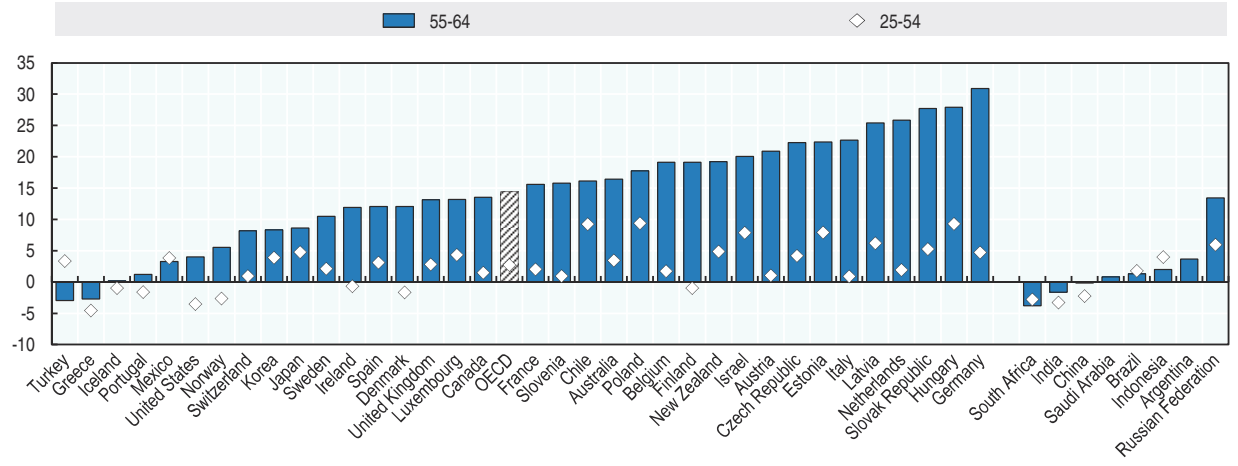


Source: OECD Employment database.

StatLink http://dx.doi.org/10.1787/888933634325

5.7. Changes in employment rate of older workers, 2000 to 2016

Percentage points difference in employment rates of older workers aged 55-64, 2000-16



Source: OECD.Stat.

StatLink http://dx.doi.org/10.1787/888933634344

EFFECTIVE AGE OF LABOUR MARKET EXIT

Key results

The average effective age of labour market exit was 65.1 for men and 63.6 for women across OECD countries in 2016. It is ten months higher than the average normal retirement age for men two months higher for women. The lowest effective exit age is found in France for men and in the Slovak Republic for women at 60.0 and 59.5 years, respectively. At the other range of the scale, Korea displayed the highest figures, at 72.0 years for men and 72.2 years for women.

On average across the OECD, the retirement age is 0.8 years lower for men than the effective age of labour market exit age; for women it is 0.2 years lower. However, there is considerable variation between countries. The effective age of exit is 4.4 years lower than the retirement age in Italy for men and 5.3 years lower for women in Belgium. By contrast, the effective labour market exit age is considerably (11 years) higher than the normal retirement age in Korea for both men and women.

The normal retirement age for a person having entered the labour market at age 20 was equal to 64.3 for men and 63.4 for women in 2016 on average across the OECD. Gender gaps in retirement ages exist in 11 OECD countries. In most of them, women's retirement age will increase to converge to men's, and the only countries that will maintain a lower age for women are Chile, Israel, Poland and Switzerland.

The effective age of labour market exit is lower than the retirement age in 20 OECD countries for women, and 15 for men and is lower for both men and women in 13 out of the 35 OECD countries. Moreover, the link between the retirement age and the labour market exit age is not always straightforward. In Chile for example women work until the age of almost 68 on average although the retirement age is only 60 for the DC pension. In Italy, women exit the labour market at age 61 despite the retirement age being 65 years and seven months.

On average the effective retirement age is 65.1 for men and 63.6 for women. Only in Estonia, France, Korea, Spain and Turkey is the effective age of labour market exit higher for women than for men. In Estonia women leave the labour market half a year after men, while in France, Korea, Spain and Turkey they leave three to four months later than men. In all other OECD countries men exit the labour market after women, with the largest differences observed in Mexico and Portugal (4.2 years).

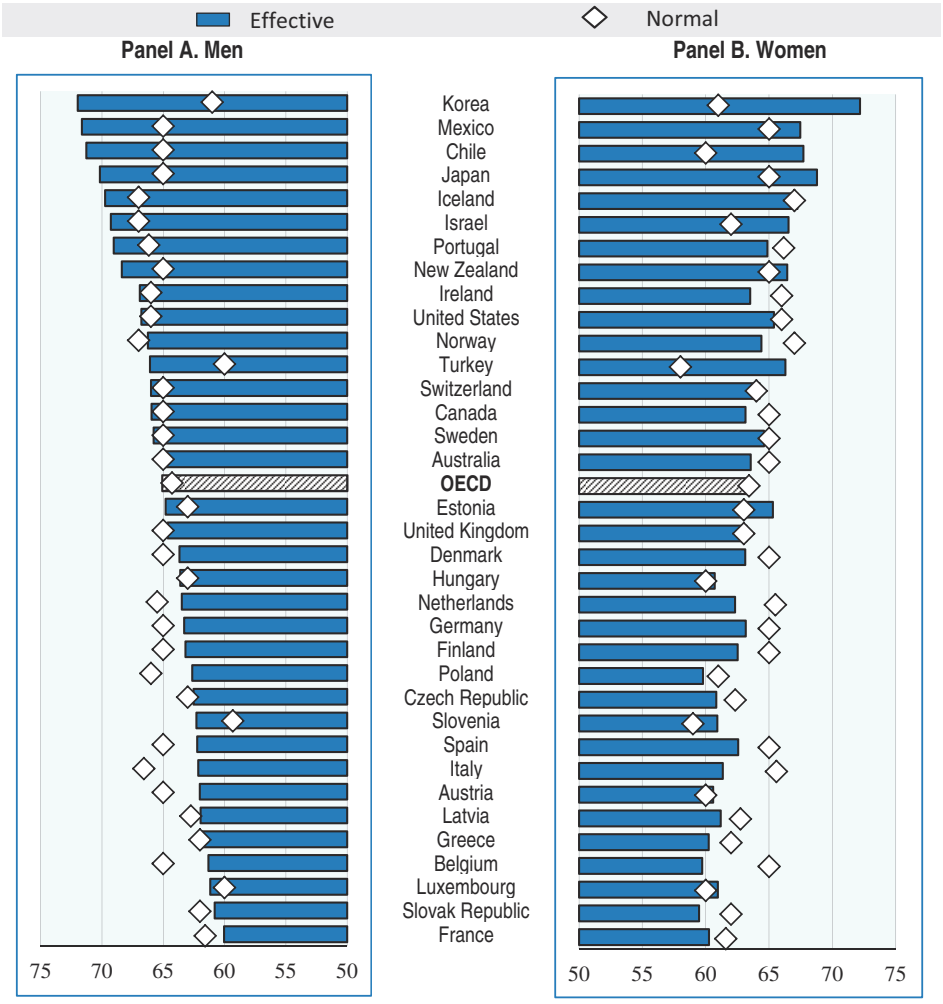
The evolution through time of the average effective exit age displays a trough in the late 1990s for women and the early 2000s for men after several decades of downward trends. In 1970 the average effective exit age was 68.4 years for men and 66.5 years for women, against 63.1 and 61.0 years, respectively, in 2000, with substantial cross-country variations: a low for men of 58.3 years in Hungary and a high of 74.6 years in Mexico; for women, the range in 2000 was 55.8 years also in Hungary and 69.8 years also in Mexico. Since the year 2000, the effective age increased by over five years for men in Hungary and Portugal and by just over six years for women in Estonia, Korea and New Zealand with Turkey increasing by over nine years.

Definition and measurement

The average effective age of retirement is defined as the average age of exit from the labour force for workers aged 40 and over. In order to abstract from compositional effects in the age structure of the population, labour force withdrawals are estimated using changes in labour force participation rates rather than labour force levels. These changes are calculated for each (synthetic) cohort divided into five-year age groups.

The normal retirement age is defined as the age of eligibility to all components of the pension system in 2016, assuming labour market entry at age 20. This age corresponds to indicator 3.4 "Current retirement ages" in Chapter 3).

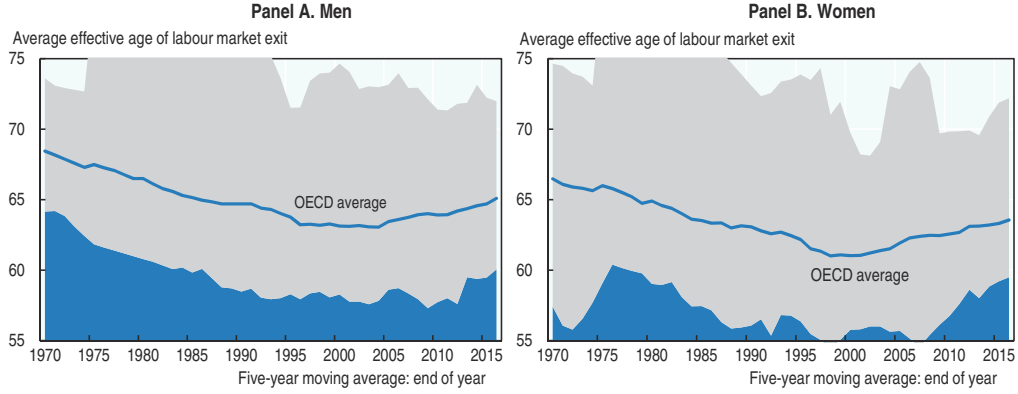
5.8. Average effective age of labour market exit and normal pensionable age in 2016



Note: Effective retirement age shown is for five year period 2011-16. Pensionable age is shown for individuals retiring in 2016 and assuming labour market entry at age 20.
Source: OECD estimates based on the results of national labour force surveys and the European Union Labour Force Survey.

StatLink http://dx.doi.org/10.1787/888933634363

5.9. Average labour market exit age in OECD countries, 1970-2016



Source: OECD estimates based on the results of national labour force surveys, the European Union Labour Force Survey and, for earlier years in some countries, national censuses.

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EXPECTED YEARS AFTER LABOUR MARKET EXIT

Key results

The expected years after labour market exit indicator measures the length of expected remaining life expectancy from the time of average labour market exit by gender. In 2016 the OECD average number of expected years in retirement was 18.1 years for men and 22.5 years for women. France had the highest expected duration, equal to 23.6 years for men 27.6 years for women. Korea had the lowest expected years after labour market exit, at 13.0 years for men and 16.2 years for women. The average duration of expected years in retirement across OECD countries has increased over time. In 1970 men in the OECD countries spent on average 11 years in retirement, and women 15 based on this indicator. By 2016 this had increased to 18 and 22 years, respectively.

This indicator illustrates the length of the expected remaining life expectancy from the time of average labour market exit. Men typically can expect to survive fewer years after labour market exit than women: 4.4 years less than women on average in the OECD (Figure 5.10). Women can expect to live more than 25 years after exit in Austria, Belgium, France, Greece, Italy, Luxembourg and Spain (Figure 5.10, Panel A). Similarly, men can expect to survive more than 20 years after labour market exit in Austria, Belgium, Finland, France, Greece, Italy, Luxembourg and Spain (Figure 5.10, Panel B). Women's expected survival duration measured at the average age of labour market exit was below 20 years in Chile, Iceland, Korea, Mexico and Turkey, and men's was below 15 years in Chile, Korea, Mexico and Turkey.

In Hungary, Latvia, Poland and Portugal the gender gap in the expected survival duration was six years or more. Longer periods after labour market exit expose women to old-age income poverty, as in some countries price indexation magnifies the impact of gender pay gaps, observed in all OECD countries, on pension benefits and of longer life expectancies.

The duration of expected survival in emerging countries is fairly low, varying from to 15.6 years in South Africa to 20.0 years in Brazil for women, and from 11.3 and 16.8 years, respectively, for men.

The average length of retirement measured at labour market exit has increased over time. In 1970 men in the OECD countries spent on average 11 years in retirement and by 2016 they could expect an average duration of retirement of 18 years (Figure 5.11, Panel B). Women who could expect to stay in retirement for 15 years on average in 1970, would enjoy a duration of retirement equal to 22 years in 2016 (Figure 5.11, Panel A). The increase in the expected duration of retirement from 1970 to 2014 is due both to a drop in the effective exit age from the labour force and to increased longevity.

The expected years in retirement increased gradually from 1970 to around 2000 because of both a gradual decrease in the effective labour market exit age and increases in life expectancy. After a couple of relatively stable years, the average effective labour market exit age started to increase from 2004. It increased by two years for both men and women between 2004 and 2016.

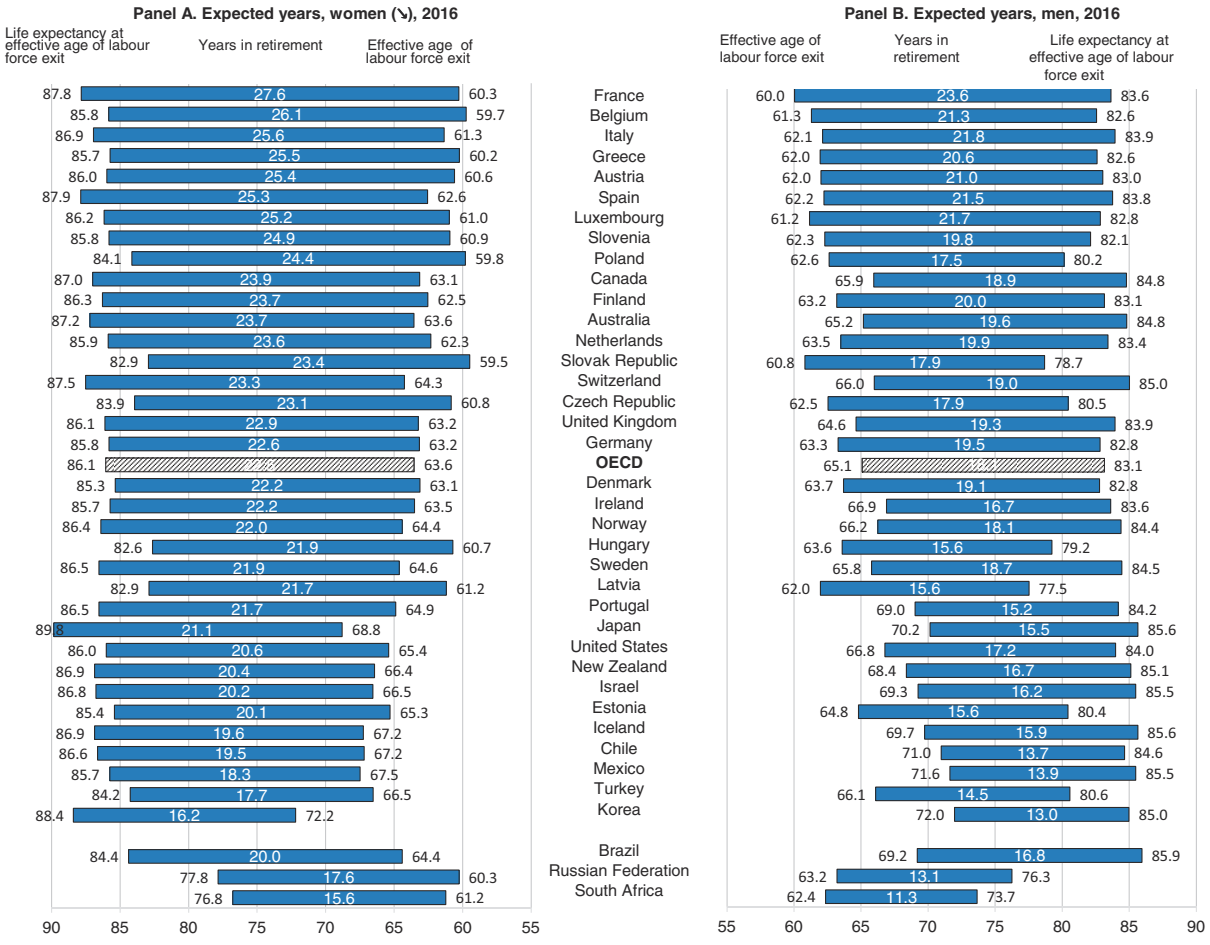
Despite continuing increases in life expectancy there has been a stabilisation of expected years in retirement since the start of the century as life expectancy gains in old age have been offset by the increases in labour market exit age.

Definition and measurement

Expected years after labour market exit is life expectancy measured at the age of effective labour market exit for men and women. Estimates of remaining life expectancy are calculated based from the UN World Population Prospects, the 2017 revision dataset.

The average effective age of retirement is defined as the average age of exit from the labour force for workers aged 40 and over. In order to abstract from compositional effects in the age structure of the population, labour force withdrawals are estimated using changes in labour force participation rates rather than labour force levels. These changes are calculated for each (synthetic) cohort divided into five-year age groups.

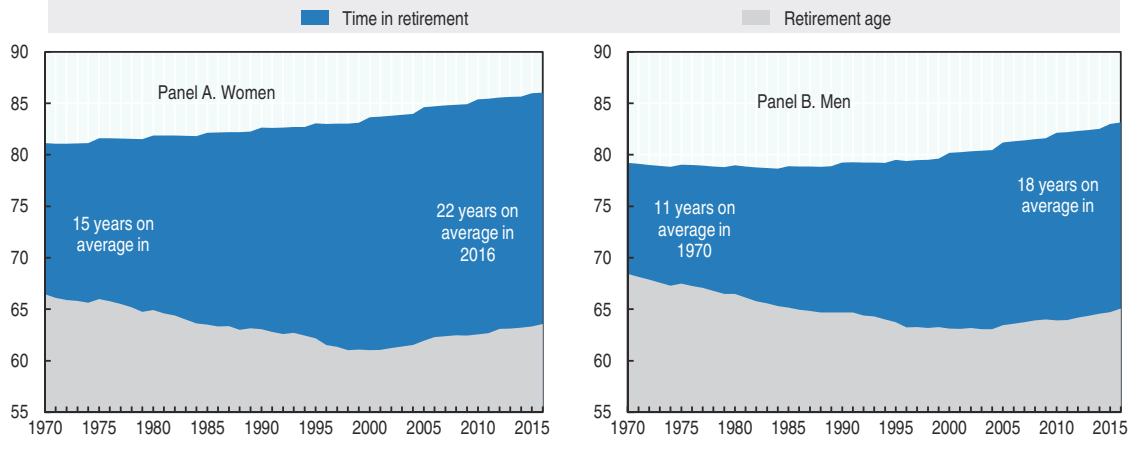
5.10. Expected years after labour market exit by gender in 2016



Note: Effective retirement age shown is for five year period 2011-16. Pensionable age is shown for 2016.
Source: OECD estimates based on the results of national labour force surveys and the European Union Labour Force Survey. Life expectancy estimates are calculated from United Nations Population Prospects: 2017 Revision.

StatLink http://dx.doi.org/10.1787/888933634401

5.11. Average years in retirement across all OECD countries, 1970-201



Source: OECD estimates based on the results of national labour force surveys, the European Union Labour Force Survey and, for earlier years in some countries, national censuses. Life expectancy estimates are calculated from United Nations Population Prospects: 2017 Revision.

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Chapter 6

Incomes and poverty of older people

These three sets of indicators look at the economic situation of older people in recent years. The first indicator examines the income of older people, comparing them with the population as a whole. It also shows the income sources of older people, whether the income comes from publicly provided benefits, occupational transfers, work, or private pensions and other savings.

The second indicator looks at poverty of older people. It shows the proportion of older people living on incomes of less than half the national median income. It also compares the poverty rates of older people with poverty rates of the population as a whole.

The final indicator presents the "Average worker earnings" that underpin all pension modelling. These data are used widely in the report and many values for parameters and all modelling results for pension entitlements are reported as percentages of national average worker earnings.

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.

INCOMES OF OLDER PEOPLE

Key results

Incomes of older people are on average lower than those of the population, even when differences in household size are taken into account. The over-65s had incomes of 88% of the total population's in 2014. The incomes of the people aged between 66 and 75 equalled 93% of the total population's while the over-75s had income equal to 80% of the total population's. In most OECD countries, public transfers provide the bulk of income in old age.

People over 65 had incomes amounting at 88% of population incomes, on average, in 2015 or latest (Table 6.1). Older people fared best in France, Israel and Luxembourg in relative terms where incomes for the over-65s were equal or slightly higher than for the total population. Older people also had relatively high incomes in Chile, Greece, Italy, Portugal and Spain with incomes above 95% of the national average. In Estonia and Korea, by contrast, older people's incomes stood at just 67% and 69% respectively.

Average incomes tend to fall with age. People aged 66-75 and those over 75 have relative incomes equal, on average, to 93% and 80% of population incomes, respectively. Lower incomes for older retirees are partly explained by cohort effects such as the growth of real earnings. Over time this translates to higher earnings for each successive cohort of retirees, which in turn leads to higher pensions income for each generation. Indexation principles of pension benefits in payment also play a large role in protecting the income of the elderly over longer periods of time. This particularly affects older women who tend to have both lower wages while active and also longer life expectancies compared to men and are over-represented among the older age groups. Moreover, older people live alone more often which lowers their equivalised disposable income, given the equivalence scale used to compute disposable income of families.

Income sources

Of the four main sources of income on which older people draw, public transfers (earnings-related pensions, resource-tested benefits, etc.) and occupational transfers account for two-thirds of the total (Figure 6.2). Public transfers account for 58% and occupational transfers represent 8% of older people's incomes on average. The over-65s who are most reliant on public transfers live in Hungary and Belgium: 89% and 84% respectively of their incomes come from that source. Public transfers represent only 8% of all income in Mexico. Occupational transfers are of particular importance in 13 OECD countries, with the Netherlands being highest at 38%.

Work accounts for 24% and income from capital for about 10% of older people's incomes on average in the OECD. Work is especially important in Mexico where it accounts for 57% of old-age income, but is also very important in Chile, Estonia, Israel, Japan, Korea, Latvia, New Zealand, Turkey and the United States where it accounts for more than 30%. Several factors are behind these values. In some countries, such as Israel and the United States, the normal pension age is higher than age 65. And in others, people keep on working to fill gaps in contribution histories or to obtain better incomes over retirement. Also, as incomes are measured for households, older people are assumed to draw on the earnings of younger family member with whom they may live. Work is likely to be a more important income source for older people where many of them live in multi-generational households.

Capital, mostly private pensions, represents 40% of all income sources of older people in Canada. In Denmark and New Zealand, capital represents over 20% of all income.

Definition and measurement

Incomes of older people groups all incomes from employment, self-employment, capital and public transfers. The data shown are for disposable incomes (i.e., net of personal income tax and social security contributions). Incomes are measured on a household basis and equivalised with the square root equivalence scale to adjust for differences in household size. See *In It Together: Why Less Inequality Benefits All* (OECD, 2015) for more details on definitions and data sources. The special chapter on "Incomes and poverty of older people" in *Pensions at a Glance2013* provides a more detailed analysis.

Further reading

OECD (2015), *In It Together: Why Less Inequality Benefits All*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264235120-en*.

OECD (2013), *Pensions at a Glance 2013 – Retirement-income Systems in OECD Countries*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/pension_glance-2013-en*.

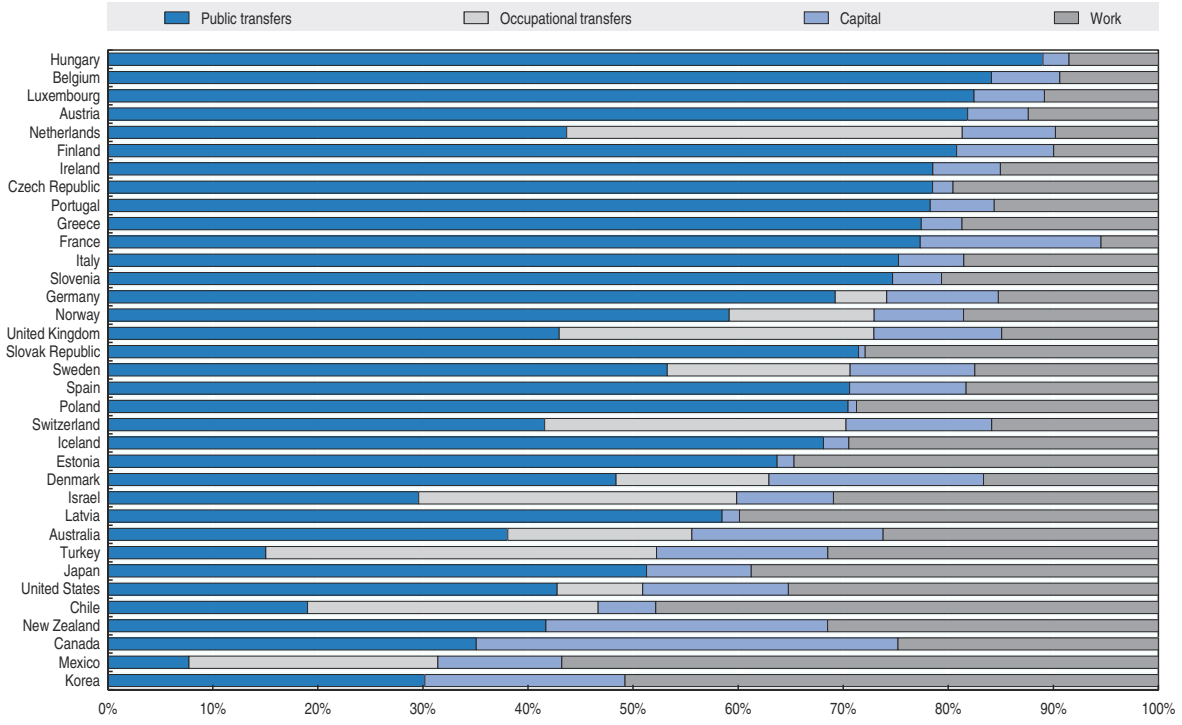
6.1. Incomes of older people, 2014 or latest available year

	Incomes of people aged over 65, % of total population incomes					Incomes of people aged over 65, % of total population incomes			
	All aged over 65	Age 66-75	Aged over 75			All aged over 65	Age 66-75	Aged over 75	
Australia	70.6	75.3	63.5	2014	Korea	68.8	68.8		2015
Austria	93.4	97.9	86.7	2014	Latvia	72.0	77.6	65.2	2014
Belgium	80.3	85.0	74.6	2014	Luxembourg	100.6	101.8	98.3	2014
Canada	91.1	94.8	85.6	2014	Mexico	89.1	94.0	81.4	2014
Chile	96.0	97.7	93.6	2015	Netherlands	83.4	89.4	74.1	2015
Czech Republic	78.1	80.5	73.9	2014	New Zealand	86.2	95.5	71.1	2014
Denmark	79.5	84.9	71.0	2014	Norway	90.4	100.3	75.7	2014
Estonia	66.5	71.5	60.7	2014	Poland	91.5	91.1	91.9	2014
Finland	85.7	94.1	74.0	2015	Portugal	95.0	103.4	85.6	2014
France	103.4	110.6	95.3	2014	Slovak Republic	87.5	90.8	80.9	2014
Germany	88.5	93.8	83.5	2014	Slovenia	90.6	94.4	85.4	2014
Greece	97.0	103.0	90.0	2014	Spain	98.8	106.2	90.9	2014
Hungary	85.2	88.8	78.8	2014	Sweden	85.9	97.7	68.0	2014
Iceland	85.7	93.7	74.7	2014	Switzerland	82.4	87.7	74.9	2014
Ireland	89.2	93.9	81.4	2014	Turkey	86.4	90.1	80.5	2014
Israel	99.9	105.9	91.5	2015	United Kingdom	82.6	90.2	72.3	2015
Italy	98.8	105.7	91.5	2014	United States	94.5	102.8	82.1	2015
Japan	89.8	92.8	86.2	2012	**OECD**	**87.6**	**92.9**	**80.4**	

Source: OECD Income *Distribution Database*, *www.oecd.org/social/income-distribution-database.htm*.

StatLink http://dx.doi.org/10.1787/888933634439

6.2. Income sources of older people, 2014 or latest available year



Note: Income from work includes both earnings (employment income) and income from self-employment. Capital income includes private pensions as well as income from the returns on non-pension savings. Data for Japan is 2012. Chile, Finland, Israel, Korea, the Netherlands, the United Kingdom and the United States are 2015.

Source: *OECD Income Distribution Database*, *www.oecd.org/social/income-distribution-database.htm*.

StatLink http://dx.doi.org/10.1787/888933634458

OLD-AGE INCOME POVERTY

Key results

On average in the OECD, 12.5% of individuals aged over 65 live in relative income poverty, defined as an income below half the national median equivalised household income. There is large variation between countries. Poverty rates are higher for older people than for the population as a whole, which averages 11.5%. However, this result is driven by a handful of countries. In 20 out of 35 OECD countries, old-age income poverty is lower than for the population as a whole.

According to the latest available figures, poverty rates of people aged over 65 were very high in Korea (46%), Latvia (27%), Australia (26%) and Mexico (26%). By contrast, the Czech Republic, Denmark, France, Luxembourg, the Netherlands and the Slovak Republic have the lowest poverty rates, all between 3% and 4%. Poverty rates are close to the OECD average of 12.5% in Slovenia and the United Kingdom.

Poverty among older age groups

Poverty among the "younger old" (aged 66-75) is less frequent than among the "older old" (aged 75 and over); the average poverty rates are 10.7% and 13.9%, respectively. The difference between the two is over eight percentage points in Israel, Latvia, Sweden, the United Kingdom and the United States. There are many explanations for this pattern. Most significantly, as real earnings have tended to grow over time, each successive cohort of retirees has a higher starting benefit. Also, women predominate among the old. Nevertheless, in two countries – Luxembourg and Poland – the over 75s fare slightly better than their younger counterparts.

One important factor that explains the varying incidence of old-age poverty is the level at which safety-net retirement benefits are set (See the indicator on "Basic, targeted and minimum pensions" in Chapter 3).

Poverty and gender

Older women are at greater risk of poverty than older men in all countries where breakdowns are available. The average old-age poverty rate for men equals 8.7% and 13.6% for women. The smallest poverty gender gaps (less than one percentage point) are observed in Chile and the Netherlands. Differences are also relatively small, around 1.5 percentage points, in Belgium, Denmark, France and Luxembourg.

The largest gender poverty gaps are in Estonia and Latvia where the poverty rates among women are around 18 percentage points higher than among men, followed by Slovenia at 11 percentage points. There are also significant differences around 7 percentage points in Israel, New Zealand, Sweden and the United States.

Poverty and age

In 15 out of 35 countries, older people are more likely to be income poor than the population (Figure 6.4). In these countries the average old-age poverty rate is equal to 21%. The largest difference between the two is found in Korea where older people have poverty rates that are 32 percentage points higher than the total population, followed by Australia and Latvia, at 13 and 10 percentage points, respectively. Older people are thus less likely to be poor than the total population in the other 20 countries. Most notably among these are Greece and Spain, where the old-age poverty rate is 7 and 10 percentage points lower than the overall rate, respectively. In this group of countries the old age poverty equals 6% while the population poverty is 10%.

Definition and measurement

For international comparisons, the OECD treats poverty as a "relative" concept. The yardstick for poverty depends on the median household income in a particular country at a particular point in time. Here, the poverty threshold is set at 50% of median, equivalised household disposable income. See OECD (2015) for more details on definitions and data sources.

Further reading

OECD (2015), *In It Together: Why Less Inequality Benefits All*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264235120-en*.

6.3. Income poverty rates by age and gender

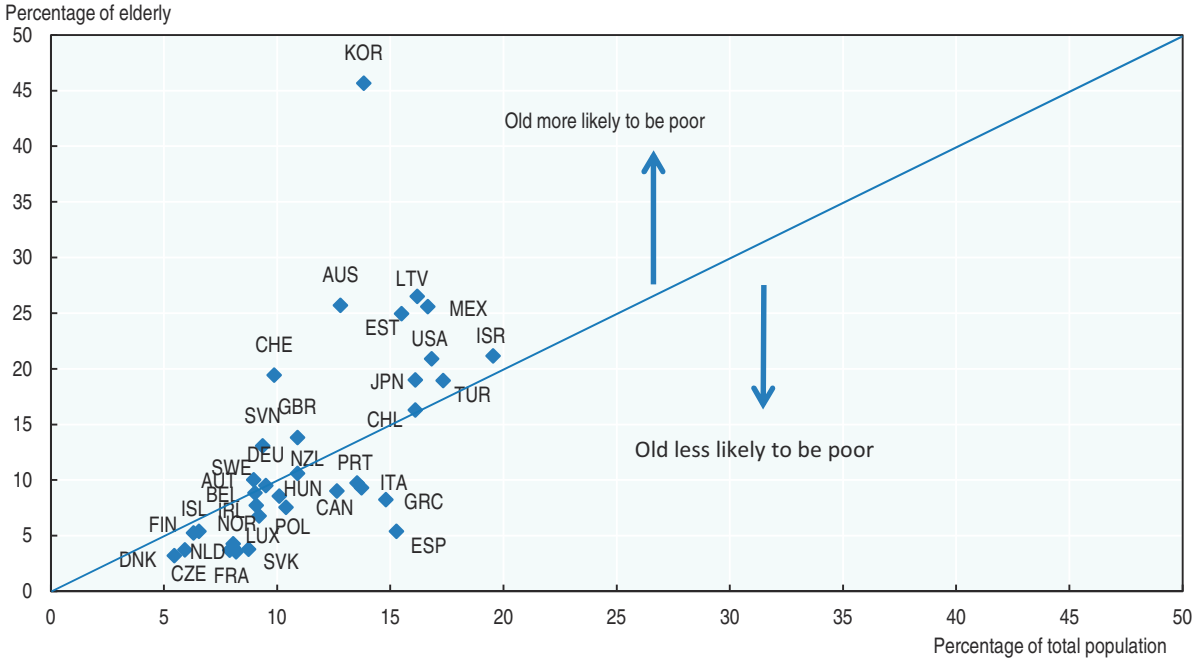
Percentage with incomes less than 50% of median household disposable income

	2014 or latest availbale							2014 or latest availbale					
	Older people (aged over 65)					Whole population		Older people (aged over 65)					Whole population
	By age			By gender				By age			By gender		
	All 66+	66-75	76+	Men	Women			All 66+	66-75	76+	Men	Women	
Australia	25.7	23.4	29.2	23.6	27.5	12.8	Korea	45.7	38.8				13.8
Austria	8.8	8.1	9.9	7.0	10.3	9.0	Latvia	26.5	22.2	31.6	13.9	32.4	16.2
Belgium	7.7	7.0	8.6	7.0	8.3	9.1	Luxembourg	3.9	4.1	3.4	3.1	4.6	8.1
Canada	9.0	8.5	9.9	6.7	11.0	12.6	Mexico	25.6	22.6	30.3	23.9	27.0	16.7
Chile	16.3	16.2	16.4	16.1	16.4	16.1	Netherlands	3.7	2.5	5.5	3.4	3.9	7.9
Czech Republic	3.7	3.5	4.1	1.5	5.3	5.9	New Zealand	10.6	7.7	15.2	6.6	14.0	10.9
Denmark	3.2	2.1	4.9	2.3	4.0	5.5	Norway	4.3	2.2	7.3	1.9	6.3	8.1
Estonia	25.0	21.9	28.5	13.3	30.8	15.5	Poland	7.6	8.3	6.7	4.6	9.3	10.4
Finland	5.2	2.9	8.5	3.2	6.8	6.3	Portugal	9.7	8.5	11.2	7.1	11.6	13.5
France	3.6	2.8	4.5	2.7	4.2	8.2	Slovak Republic	3.8	3.3	4.8	1.9	4.9	8.7
Germany	9.5	8.4	10.3	6.8	11.5	9.5	Slovenia	13.1	10.3	16.9	6.4	17.8	9.4
Greece	8.2	7.1	9.5	6.9	9.3	14.8	Spain	5.4	4.7	6.2	3.7	6.7	15.3
Hungary	8.6	7.8	9.9	5.0	10.6	10.1	Sweden	10.0	6.6	15.2	6.4	13.1	9.0
Iceland	5.4	4.9	6.1	3.5	7.1	6.5	Switzerland	19.4	16.3	23.8	16.6	21.8	9.9
Ireland	6.8	5.2	9.3	5.7	7.7	9.2	Turkey	18.9	16.2	23.2	17.0	20.4	17.3
Israel	21.2	17.6	26.1	17.7	23.9	19.5	United Kingdom	13.8	10.4	18.5	11.1	16.0	10.9
Italy	9.3	8.9	9.7	6.7	11.2	13.7	United States	20.9	17.6	25.7	17.2	23.9	16.8
Japan	19.0	17.0	21.3	15.1	22.1	16.1	**OECD**	**12.5**	**10.7**	**13.9**	**8.7**	**13.6**	**11.5**

Note: 2012 for Japan. 2015 for Chile, Finland, Israel, Korea, the Netherlands, the United Kingdom and the United States.
Source: *OECD Income Distribution Database, www.oecd.org/social/income-distribution-database.htm.*

StatLink http://dx.doi.org/10.1787/888933634477

6.4. Income poverty rates by age



Source: *OECD Income Distribution Database, www.oecd.org/social/income-distribution-database.htm.*

StatLink http://dx.doi.org/10.1787/888933634496

AVERAGE WAGE

Key results

"Average wage (AW)" is an important metric as all pension modelling results are presented as multiples of this measure. The average for all OECD countries was USD 36 622 in 2016.

Table 6.5 reports the OECD's average wage (AW) levels for the year 2016. The wage earnings are defined as gross wages before deductions of any kind (including personal income taxes and social security contributions), but including overtime pay and other cash supplements paid to employees.

Average wages are displayed in national currencies and in US dollars (both at market exchange rates and at purchasing power parities, PPP). The PPP exchange rate adjusts for the fact that the purchasing power of a dollar varies between countries: it allows for differences in the price of a basket of goods and services between countries.

Wage earnings across the OECD countries averaged USD 36 622 in 2016 at market exchange rates. Switzerland and Iceland have the highest levels at USD 83 908 and USD 74 862, respectively. These are approximately 15 times the level recorded in Mexico, at USD 5 441, which is around 50% of the next lowest countries, Turkey (USD 10 438) and Latvia (10 705).

At PPP wages averaged USD 42 682. Switzerland is again highest amongst OECD countries, at USD 69 268, with Luxembourg next at USD 64 007. Mexico is again the lowest, at USD 13 166, but is now followed by Chile and Latvia at around USD 20 600. The higher figure for PPP wages suggests that many OECD countries exchange rates with the US dollar were lower than the rate that would equalise the cost of a standard basket of goods and services.

Average wages for the other major economy countries are not based on the average wage earnings definition or another consistent basis as such a series is unfortunately not available. Data have been collected from national sources and thus vary between average individual income, average covered wage and average wage for a particular group of workers as available. The figures used range from a low of USD 1 462 in India to a high of USD 24 949 in Saudi Arabia, at market exchange rates.

Definition and measurement

The "average worker" earnings series (AW), defined as the average full-time adult gross wage earnings, was adopted from the second edition of *Pensions at a Glance* (OECD, 2007). This concept is broader than the previous benchmark of the "average manual production worker" (APW) because it covers more economic sectors and includes both manual and non-manual workers. The new AW measure was introduced in the OECD report *Taxing Wages* and also serves as benchmark for *Benefits and Wages*. The third edition of *Pensions at a Glance* (OECD, 2009) also included a comparison of replacement rates under the old and new measures of earnings for eight countries where the results were significantly different.

Further reading

OECD (2017), Taxing Wages 2017, OECD Publishing Paris,http://dx.doi.org/10.1787/tax_wages-2017-en.

OECD (2009), *Pensions at a Glance 2009: Retirement-Income Systems in OECD Countries*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/pension_glance-2009-en.*

6.5. Average wage (AW), 2016

National currency and USD at market price and purchasing-power-parity exchange rates

	OECD measures of average wages			Exchange rate with USD	
	National currency	USD, market exchange rate	USD, PPP	Market rate	PPP
OECD members					
Australia	82 114	59 134	56 016	1.39	1.47
Austria	44 409	46 730	55 685	0.95	0.80
Belgium	46 570	49 004	58 141	0.95	0.80
Canada	50 997	37 935	40 181	1.34	1.27
Chile	8 003 491	11 962	20 538	669.10	389.70
Czech Republic	330 072	12 852	25 664	25.68	12.86
Denmark	412 555	58 383	57 015	7.07	7.24
Estonia	13 640	14 352	25 209	0.95	0.54
Finland	43 816	46 105	48 425	0.95	0.90
France	38 049	40 038	47 355	0.95	0.80
Germany	47 809	50 307	61 451	0.95	0.78
Greece	20 074	21 123	32 849	0.95	0.61
Hungary	3 312 081	11 255	24 785	294.28	133.63
Iceland	8 456 409	74 862	59 986	112.96	140.97
Ireland	35 592	37 452	44 020	0.95	0.81
Israel	142 247	36 930	37 642	3.85	3.78
Italy	30 642	32 243	42 370	0.95	0.72
Japan	5 110 601	43 692	50 086	116.97	102.04
Korea	43 857 243	36 328	49 071	1 207.26	893.75
Latvia	10 173	10 705	20 674	0.95	0.49
Luxembourg	56 197	59 134	64 007	0.95	0.88
Mexico	112 827	5 441	13 166	20.74	8.57
Netherlands	50 853	53 511	63 210	0.95	0.80
New Zealand	57 649	39 912	39 756	1.44	1.45
Norway	564 218	65 250	56 250	8.65	10.03
Poland	47 782	11 414	27 240	4.19	1.75
Portugal	17 521	18 437	29 957	0.95	0.58
Slovak Republic	10 918	11 488	22 426	0.95	0.49
Slovenia	18 292	19 247	31 231	0.95	0.59
Spain	26 710	28 106	40 439	0.95	0.66
Sweden	423 065	46 453	47 090	9.11	8.98
Switzerland	85 536	83 908	69 268	1.02	1.23
Turkey	36 806	10 438	27 389	3.53	1.34
United Kingdom	36 571	45 100	52 731	0.81	0.69
United States	52 543	52 543	52 543	1.00	1.00
OECD		**36 622**	**42 682**		
Argentina	276 224	17 424	29 969	15.85	9.22
Brazil	25 248	7 756	12 656	3.26	2.00
China	62 029	8 932	17 718	6.94	3.50
India	99 349	1 462	5 665	67.97	17.54
Indonesia	19 200 000	1 422	4 692	13 500	4 091.83
Russian Federation	440 948	7 197	17 410	61.27	25.33
Saudi Arabia	93 573	24 949	68 301	3.75	1.37
South Africa	112 488	8 189	19 219	13.74	5.85

Note: AW = average worker wage. PPP = purchasing power parity. The market exchange rate used is from the 31 December 2016. PPP is 2016.

StatLink http://dx.doi.org/10.1787/888933634515

Chapter 7

Finances of retirement-income systems

The indicators in this chapter look at the finances of the retirement-income system. The first indicator presents an overview of the "Mandatory pension contributions" that workers have to pay towards their future pension entitlements.

The second indicator looks at the "Public expenditure on pensions". It shows how much of gross domestic product is allocated towards national public pensions and the overall share of public pensions in the government budget. The third indicator focuses on private pension spending and looks at the total benefit spending on mandatory, quasi-mandatory and voluntary private schemes.

The final indicator presents long-term projections of pension spending and in particular the evolution of public expenditure on pensions in the period 2013-15 to 2050.

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.

MANDATORY PENSION CONTRIBUTIONS

Key results

Mandatory pension contribution rates for an average earner averaged 18.4% in 2016 for the 22 OECD countries that have specific contributions for pensions only. For another 12 countries social insurance contributions and mandatory private pension contribution rates averaged 22.9% for employee and employer contributions combined.

Most of the measures presented in *Pensions at a Glance* look at the benefits side of the pension system. The indicators here look at the contribution side, mapping out how much the average workers contributed towards their pension in 2016. Tax financed pension benefits are not covered here.

Since different pension components in a country can be financed through different income sources mapping out the pension's contribution terrain is very important but it can also be difficult. This presentation aims to give a broad picture of the pension schemes modelled herein and where data are available.

The upper table presents the 22 OECD countries where pension contributions are mandatory, either public or private. Countries that belong to this group have pension systems where the contribution rate paid is more directly linked to the pensions system. The average contribution rate in this group equalled 18.4% in 2016. The highest total mandatory contribution rates are found in Hungary and Italy at 30.75% and 33.0%, respectively, with no other country above 26%. By contrast the contribution in Mexico amounts to only 6.275%. In both Australia and Canada, tax financed components play a large role and so contribution rates are consequently below 10%. The same is true for New Zealand, but as there is no mandatory earnings related scheme it is not included in either table.

The average contribution rate to the public schemes is 15.4% compared to 10.7% for private schemes. Within the public scheme employee contributions are around two-thirds of those of employers, representing 6.0% and 9.4%, respectively. For the private scheme there is less difference between employee and employer contributions being 4.5% and 6.2% respectively.

The lower table looks at the mandatory private and mandatory social insurance contribution rates that apply for a private-sector worker. In this group it is difficult to separate the pension contributions paid by the employee and employer to pension benefits from the other parts of social insurance such as survivor's benefits, disability benefits, unemployment etc. In addition individuals cannot choose which systems to belong to and they therefore have to contribute fully to all parts.

The average contribution rate in this group is 22.9% for an average earner in 2016. The highest mandatory private and social insurance contributions are found in Latvia at 34.1% and the lowest in the United States at 12.4% and Ireland at 14.75%, with all the other countries between 20.0% and 28.3%. In Latvia, 20% contribution finances future pension entitlements in the NDC and DC schemes with the remaining 14.1% financing unemployment, disability, sickness, injury, maternity, parental and survivor (for children) benefits.

On average employer contributions are twice those made by employees at 15.3% and 7.7% respectively, with virtually all the contributions being to public schemes. An exception to the contribution ratio between employees and employers is Slovenia, where the reverse is almost the case, as employees pay 15.5% compared to 8.85% for employers.

Countries with higher pension contribution rates often have above average pension benefits (as in the case of Iceland, Italy and the Netherlands), or longer duration in retirement through lower retirement age as is the case in France. Higher mandatory pension contribution rates might lower overall employment and increase informality.

Further reading

OECD (2017), *Taxing Wages 2017*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/tax_wages-2017-en*.

7.1. Mandatory pension contribution rates for an average worker in 2016

	Public		Private		Total
	Employee	Employer	Employee	Employer	
Australia	0.0	9.5			9.5
Belgium	7.5	8.86			16.4
Canada	4.95	4.95			9.9
Chile			11.23	1.15	12.4
Denmark	0.26	0.52	4	8	12.8
Finland	7.20	18.00			25.2
France	7.25	10.40	3.10	4.65	25.40
Germany	9.35	9.35			18.7
Hungary	10.0	20.75			30.75
Iceland	0.0	7.35	4	8	19.35
Israel	3.75	3.75	5.5	12.0	25.0
Italy	9.19	23.81			33.0
Japan	8.914	8.914			17.828
Korea	4.5	4.5			9.0
Luxembourg	8.0	8.0			16.0
Netherlands	4.9	0.0	16	20.9	
Mexico			1.125	5.15	6.275
Poland	9.76	9.76			19.52
Slovak Republic	4.0	14.0			18.0
Sweden	7.0	11.4	0.0	4.5	22.9
Switzerland	4.2	4.2	3.9	3.9	16.2
Turkey	9.0	11.0			20.0

Note: In some cases, pension contribution revenues have been calculated assuming that the revenues are split between different social security programmes in the same proportion as the contribution rates. The total contribution includes payments from people who are not employed (principally the self-employed). In Denmark the ATP contribution is expressed as percentages of AW earnings DNK 412 555.
Source: OECD (various years), *Taxing Wages*; OECD (2016), *Revenue* Statistics; Social Security Administration, United States (various years), *Social Security Programs throughout the World*; OECD pension and tax models.

StatLink http://dx.doi.org/10.1787/888933634534

7.2. Social insurance contribution and mandatory private contribution rates for an average worker in 2016

	Public		Private		Total
	Employee	Employer	Employee	Employer	
Austria	10.25	12.55			22.8
Czech Republic	6.5	21.5			28.0
Estonia		16.0	2.0	4.0	22.0
Greece	6.67	13.3			20.0
Ireland	4	10.75			14.75
Latvia	10.5	23.59			34.09
Norway	8.2	14.1		2.0	22.3
Portugal	6.4	13.8			20.2
Slovenia	15.5	8.85			24.4
Spain	4.7	23.6			28.3
United Kingdom	12	13.8			25.8
United States	6.2	6.2			12.4

Note: In some cases, pension contribution revenues have been calculated assuming that the revenues are split between different social security programmes in the same proportion as the contribution rates. The total contribution includes payments from people who are not employed (principally the self-employed).
Source: OECD (various years), *Taxing Wages*; OECD (2016), *Revenue* Statistics; Social Security Administration, United States (various years), *Social Security Programs throughout the World*; OECD pension and tax models.

StatLink http://dx.doi.org/10.1787/888933634553

PUBLIC EXPENDITURE ON PENSIONS

Key results

Public spending on cash old-age pensions and survivors' benefits in the OECD increased from an average of 6.7% of gross domestic product (GDP) to 8.2% between 2000 and 2013. Public pensions are often the largest single item of social expenditure, accounting for 18% of total government spending on average in 2013.

Greece spent the largest proportion of national income on public pensions among OECD countries in 2013: 17.4% of GDP. Other countries with high gross public pension spending are also found in continental Europe, with Italy at 16.3% and Austria, France and Portugal at about 13% to 14% of GDP. Public pensions generally account for between one-fourth and one-third of total public expenditure in these countries.

Iceland and Mexico spent 2.0% and 2.3% of GDP on public pensions respectively. Korea is also a low spender at 2.6% of GDP. Iceland and Mexico are countries with relative young populations and Korea's pension system is not mature yet: the public, earnings-related scheme was only established in 1988 and the new targeted basic pension was introduced only in 2014. In Mexico, low spending also reflects relatively narrow coverage of pensions (only around 35% of employees). In Iceland, much of retirement income is provided by compulsory occupational schemes (see the next indicator of "Pension-benefit expenditures: Public and private"), leaving a lesser role for the public sector in providing old-age income. In addition the retirement age is high at age 67.

Spending also tends to be low in countries with favourable demographics, such as Australia, Canada, Ireland and New Zealand. However, this is not always the case: Turkey spends 8.1% of GDP on public pensions despite being the second youngest OECD country in demographic terms. This is more than Denmark, the Netherlands, the United Kingdom and the United States, despite the fact that these countries have a higher share of people age over 65 as a share of the population than in Turkey.

Trends

Public pension spending was fairly stable as a proportion of GDP over the period 1990-2013 in six countries: Canada, Iceland, Ireland, Luxembourg, Norway and Sweden.

In another two countries, the Netherlands and New Zealand, public pension spending grew markedly more slowly than national income. In the Netherlands this change reflects the growing importance of occupational pension which reduces the reliance on targeted public pensions. In New Zealand, the decline of around 30% reflects two policies: freezing the value of the basic pension in 1992-94 and increasing pension age from 60 to 65 years. Often reductions in public pension expenditure are met by increases in private and occupational pension expenditure.

Public pension expenditure more than doubled relative to national income in six OECD countries. In Korea, Mexico and (to a lesser degree) Turkey, this reflected the low starting point in 1990. But Poland and Portugal moved from spending below the OECD average to well above. The change in Japan results from rapid ageing.

Gross and net spending

The penultimate column of the tables shows public spending in *net* terms: after taxes and contributions paid on benefits. Net spending is significantly below gross spending in Austria, France, Italy, Poland, Portugal, Switzerland and the Nordic countries, due to taxes on pension benefits. Gross and net spending are similar where pensions are not taxable such as the Slovak Republic or where public benefits are generally below basic tax reliefs (Australia, the Czech Republic, Ireland and the United Kingdom).

Non-cash benefits

The final column of the table shows total gross public spending on older people, including noncash benefits. In three countries, such benefits exceed 2% of GDP. The most important in Denmark, Norway and Sweden are housing benefits. These are defined as "non-cash benefits" because they are contingent on particular expenditure by individuals. Australia, Finland, Japan and the Netherlands also record high figures for non-cash benefits.

7.3. Public expenditure on old-age and survivors benefits

	Public expenditure on cash benefits for old-age and survivors									Total inc. non-cash (% of GDP)
	Level (% of GDP)					Change (%)	Level (% of total government spending)		Level in net terms (% of GDP)	
	1990	2000	2005	2010	2013	2000-13	2000	2013	2013	2013
Australia	3.1	4.7	3.7	3.8	4.3	-8.5	12.9	11.7	4.3	5.2
Austria	11.3	12.0	12.0	13.1	13.4	11.7	23.8	26.2	11.4	14.0
Belgium	8.9	8.7	8.8	9.7	10.2	17.5	17.7	18.3	10.2	10.5
Canada	4.2	4.2	4.0	4.3	4.6	9.1	10.3	11.1	4.3	4.6
Chile		5.0	3.7	3.4	3.0	-40.6			2.9	3.0
Czech Republic	5.6	6.9	6.7	8.1	8.7	26.0	17.1	20.4	8.7	8.9
Denmark	6.1	6.3	6.5	7.2	8.0	26.3	12.0	14.1	5.8	10.1
Estonia		6.0	5.3	7.6	6.4	6.9	16.5	16.8	6.3	6.5
Finland	7.2	7.4	8.1	9.8	11.1	49.7	15.5	19.3	9.2	12.3
France	10.4	11.4	12.0	13.2	13.8	21.1	22.4	24.3	12.6	14.3
Germany	9.5	10.8	11.1	10.6	10.1	-6.5	24.2	22.7	9.7	10.1
Greece	9.5	10.4	11.4	13.3	17.4	67.6	22.3	31.5	16.2	17.5
Hungary		7.5	8.4	9.6	10.3	38.0	15.8	20.8	10.3	10.8
Iceland	2.2	2.1	1.9	1.6	2.0	-3.1	5.1	4.6	2.0	2.5
Ireland	4.8	2.9	3.2	4.9	4.9	68.8	9.5	12.5	4.5	5.4
Israel		4.6	4.8	4.8	4.9	6.5	9.6	11.9	4.9	5.5
Italy	11.3	13.5	13.6	15.3	16.3	20.9	29.6	31.9	14.0	16.4
Japan	4.8	7.3	8.5	10.0	10.2	40.5	18.9	24.2	9.7	12.1
Korea	0.7	1.3	1.4	2.0	2.6	99.3	5.3	8.2	2.6	2.7
Latvia	0.0	8.7	5.5	9.3	7.5	-13.7	23.2	20.3	7.2	7.7
Luxembourg	7.7	7.1	7.9	8.1	8.5	20.1	19.5	19.7	7.5	8.5
Mexico	0.4	0.8	1.2	1.8	2.3	175.4		8.9	2.3	0.2
Netherlands	6.3	4.7	4.7	5.0	5.4	16.1	11.2	11.7	4.9	6.4
New Zealand	7.2	4.9	4.2	4.6	5.1	4.0	14.3	14.3	4.4	5.1
Norway	5.5	4.7	4.8	5.2	5.8	23.6	11.2	13.2	4.7	7.9
Poland	5.0	10.5	11.3	11.1	10.3	-1.6	24.9	24.2	9.3	10.4
Portugal	4.8	7.8	10.0	12.0	14.0	78.4	18.3	27.9	13.0	14.0
Slovak Republic		6.3	6.1	6.8	7.2	15.0	12.0	17.5	7.2	7.5
Slovenia		10.3	9.7	11.0	11.8	14.3	22.4	19.6	11.8	12.0
Spain	7.7	8.4	7.9	9.8	11.4	35.6	21.5	25.3	10.9	12.0
Sweden	7.3	6.9	7.2	7.3	7.7	11.8	12.8	14.7	6.0	10.0
Switzerland	5.2	6.0	6.2	6.1	6.4	5.9	17.6	18.7	5.2	6.6
Turkey	2.4	4.9	6.0	7.7	8.1	66.4			8.1	8.3
United Kingdom	4.5	5.1	5.3	6.1	6.1	20.9	13.3	13.8	5.9	6.6
United States	5.8	5.6	5.7	6.6	7.0	24.6	16.7	18.4	6.5	7.0
OECD	**5.8**	**6.7**	**6.8**	**7.7**	**8.2**	**21.8**	**16.5**	**18.1**	**7.6**	**8.6**

Note: See Adema, W. and M. Ladaique (2009), "How Expensive is the Welfare State? Gross and Net Indicators in the OECD Social Expenditure Database (SOCX)", *OECD Social, Employment and Migration Working Paper*, No. 92, OECD, Paris, *http://dx.doi.org/10.1787/220615515052* for more details on the data, sources and methodology.

Source: OECD Social Expenditures Database (SOCX); *OECD Main Economic Indicators Database*.

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PENSION-BENEFIT EXPENDITURES: PUBLIC AND PRIVATE

Key results

Payments from private pension schemes were worth 1.5% of gross domestic product (GDP) on average in 2013 in the 24 OECD countries for which data are available. This is equivalent to one-fifth of average public spending on retirement benefits. Private-pension payments increased from 1.0% of GDP in 1990, but have been broadly stable since 2000.

Private pensions are mandatory or achieve near-universal coverage through industrial relations agreements ("quasi-mandatory") in less than half of the 35 OECD countries. In others, voluntary private pensions – either individual ("personal") or employer-provided ("occupational") – have broad coverage.

The biggest flow of private-pension payments is in the Netherlands: 6.0% of GDP in 2013. Added to public spending, total benefits are 11.5% of GDP. The United States is next at 5.0% followed by Switzerland at 4.9% of GDP. While Swiss occupational plans are compulsory, the data on private-pension payments include benefits from voluntary schemes above the statutory minimum level.

The next four countries – Canada, Iceland, Sweden and the United Kingdom – record private-pension payments of between 2.9% and 4.4% of GDP. Japan (where private pensions are voluntary) also has high levels of expenditure on private pensions, at 2.7% of GDP. Iceland has the highest share of private in total pension expenditure at 65%.

Many countries introduced compulsory private pensions in the 1990s: Australia, Estonia, Mexico, Poland, the Slovak Republic and Sweden. In some cases – particularly in Central and Eastern Europe – these new schemes were mainly taken up by younger workers. Many of them have yet to begin paying benefits. Much of the private benefit payouts recorded in Australia and Sweden relate to voluntary and quasimandatory (respectively) schemes that were already in place before private pensions were made compulsory. In all these cases, it will be some decades before all retirees have spent a full career in compulsory private pension plans.

Trends

The countries with the fastest growth in private-pension payments tended to start from a low base, below 0.5% of GDP. But there are exceptions, such as Iceland, Sweden and Switzerland. In the latter, occupational pensions became compulsory in 1985, which extended coverage significantly. This is now being reflected in the rapid growth in private pension entitlements as each successive generation of retirees has spent longer on average covered by private pensions.

Tax breaks

Many OECD countries offer favourable tax treatment to retirement savings made through private pension plans. Often, individual contributions are fully or partially deductible from income-tax liabilities and investment returns are fully or partially relieved from tax. Some countries offer tax relief on pension payments (see "Tax treatment of pensions and pensioners" in Chapter 4).

The cost of these fiscal incentives is measured in many OECD countries using the concept of "tax expenditures", developed in the 1960s. This attempts to quantify the value of the preferential tax treatment relative to a benchmark tax treatment. The idea is that this is the amount the government would have to provide as a subsidy (a direct expenditure) to achieve the same effect.

Data on tax expenditures for retirement savings are available for 21 OECD countries. Over two-thirds of these figures are 0.2% of GDP or less. And in only four countries – Australia, Canada, Germany and the United Kingdom – are reported tax expenditures worth 1% of GDP or more.

Tax expenditure figures come with important caveats: they are not comparable between countries because of differences in the benchmark tax system chosen. Despite their name, they are not equivalent to direct expenditures and so should not be added to numbers for public pension spending.

Further reading

Adema, W. and M. Ladaique (2009), "How Expensive is the Welfare State? Gross and Net Indicators in the OECD Social Expenditure Database (SOCX)", *OECD Social, Employment and Migration Working Paper*, No. 92, OECD Publishing, Paris, *http://dx.doi.org/10.1787/220615515052*.

OECD (2010), *Tax Expenditures in OECD Countries*, OECD Publishing, Paris, *http://dx.doi.org/ 10.1787/ 9789264076907-en*.

7.4. Pension-benefit expenditures: Public and private

	Scheme type	Benefit expenditure of private pension schemes						Public and private benefit spending (% of GDP)	Tax breaks for private pensions (% of GDP)
		Level (% of GDP)					Change (%)		
		1990	2000	2005	2010	2013	2000-13	2013	2013
Australia	v		2.5	1.4	1.5	1.7	-32.6	6.0	1.7
Austria	v	0.4	0.6	0.5	0.6	0.7	14.5	14.0	0.0
Belgium	v	1.0	1.3	1.5	1.1	1.1	-14.1	11.3	0.2
Canada	v	2.5	3.9	4.2	3.4	3.2	-18.1	7.8	2.0
Chile	m			1.2	1.3	1.4		4.4	
Czech Republic	m	0.0	0.2	0.2	0.4	0.3	40.2	9.0	0.0
	v	a	0.0	0.0	0.1	0.1	120.0		
Denmark	q/m	1.6	2.4	2.5	1.2	1.0	-60.4	8.9	
Estonia								6.4	
Finland	v	0.1	0.3	0.2	0.2	0.2	-15.2	11.3	0.1
France	m	0.2	0.2	0.2	0.0	0.0	-71.0	14.1	0.1
	v	0.0	0.1	0.1	0.2	0.2	63.1		
Germany	v	0.7	0.7	0.7	0.8	0.8	17.6	10.9	1.1
Greece	v	0.4	0.4	0.4	0.4	0.4	1.8	17.8	
Hungary								10.3	
Iceland	m	1.4	2.3	2.7	3.4	3.8	67.1	5.9	0.0
Ireland	v	0.9	0.8	0.8	0.8	0.8	-8.2	5.7	0.9
Israel								4.9	
Italy	m	1.0	0.9	1.0	0.5	0.4	-51.7	16.7	0.0
	v	0.1	0.3	0.2	0.3	0.4	52.3		
Japan	m	0.2	0.5	0.4	0.6	0.7	28.9	12.9	0.0
	v	a	2.9	2.2	2.7	2.7	-7.8		
Korea	v	m	0.0	0.0	0.0	0.0		2.6	
Latvia								7.5	
Luxembourg	v	a	a					8.5	0.0
Mexico								2.3	0.2
Netherlands	m	0.0	0.0	0.0	0.0	0.0		11.5	
	q	3.6	4.5	4.9	5.3	6.0	34.2		
New Zealand								5.1	
Norway	v/m	0.6	0.6	0.6	0.6	0.8	34.6	6.6	0.2
Poland								10.3	0.0
Portugal	v	0.3	0.4	0.6	0.5	0.6	55.4	14.5	0.0
Slovak Republic	v	a	0.2	0.4	0.3	0.4	80.9	7.5	0.0
Slovenia								11.8	
Spain								11.4	0.2
Sweden	q/m	1.2	1.6	1.8	2.3	2.9	75.9	10.6	
Switzerland[1]	m	2.2	4.0	4.5	4.7	4.9	22.3	11.2	
	v	0.0	0.0	0.0	0.0	0.0	8.6		
Turkey								8.1	
United Kingdom	v/m	4.0	5.8	4.5	4.3	4.4	-24.3	10.5	1.2
United States	v	2.6	3.6	3.6	4.4	5.0	37.6	12.0	0.8
OECD		**1.0**	**1.4**	**1.4**	**1.4**	**1.5**	**5.5**	**9.4**	**0.4**

m = mandatory private scheme, q = quasi mandatory; and v = voluntary.

Source: OECD Social Expenditures Database (SOCX); *OECD Main Economic Indicators Database*. See Adema and Ladaique (2009) for more details on the data, sources and methodology.

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LONG-TERM PROJECTIONS OF PUBLIC PENSION EXPENDITURE

Key results

Public spending on pensions has been on the rise in most OECD countries for the past decades, as shown by the previous two indicators. Long-term projections show that pension spending is expected to go on growing in 21 OECD countries and fall in 14. On average pension expenditure is forecast to increase from around 8.9% of gross domestic product (GDP) in 2013-15 to 9.5% of GDP in 2050.

The main driver of growing pension expenditures is demographic change. The projections shown opposite are derived either from the European Commission's *2015 Ageing Report* – which covers the EU28 members plus Norway – or from Standard & Poor's Global Ageing 2016 report. In the main table, data are presented forwards to 2060 for those countries where the figures are available. However, since the horizon is 2050 only for 11 OECD countries and all the other major economies this is the main comparison in the table.

Long-term projections are a crucial tool in planning pension policy: there is often a long time lag between when a pension reform occurs and when it begins to affect public pension expenditure. There are some differences in the range of different programmes covered in the forecasts, reflecting the complexity and diversity of national retirement-income provision. For example, data for a number of countries do not include special schemes for public-sector workers while in others they are included. Similarly, projections can either include or exclude spending on resource-tested benefits for retirees. The coverage of the data also differs from the *OECD Social Expenditures Database* (SOCX), from which the data on past spending trends in the previous two indicators were drawn. The numbers for 2013-15 may differ between the SOCX database and the sources used here because of the different range of benefits covered and the definitions used.

Nevertheless, the figures do reveal broad trends. Pension spending is projected to grow from 8.9% of GDP to 9.5% of GDP by 2050 on average across all OECD countries. In the EU28 it is projected to increase from 11.2% of GDP in 2020 to 11.7% of GDP in 2035, before receding back to current levels. This would be a significant achievement given the demographic change throughout the time period. The indicator of the "Old-age dependency ratio" in Chapter 5 shows an about 90% increase in the demographic dependency ratio, the number of people above the age 65 per 100 people aged between 20 and 64 from today until 2050. Cuts in benefits for future retirees, through lowered indexation and valorisation or benefit formulae, together with increases in the age at which individuals first can claim pension benefits, will reduce growth in public pension expenditure.

Public pension expenditure is expected to increase in 21 OECD countries by 2050. In Korea, pension spending would more than double by 2050, though the increase is from a low base. This rapid increase reflects both the ageing process and the still maturing pension system. In Slovenia, public spending is projected to rise further: from above the OECD average at 12% of GDP, to 16% of GDP by 2050.

Long-term public pension spending is expected to increase in all major economies but India, where it is constant at 1% of GDP, reflecting the low coverage levels. Most notably in Brazil where pension expenditure will grow from 9% currently and reach 17% of GDP by 2050 and in Saudi Arabia where it will increase by 250% form 2.7% in 2015 to 9.4% by 2050.

Further reading

European Commission (2015), *2015 Ageing Report*; Economic and budgetary projections for the 28 EU Member States (2013-2060), Publications Office of the European Union, Luxembourg.

Standard & Poor's (2016), *Global Aging 2016: 58 Shades of Gray*, McGraw Hill Financial.

7.5. Projections of public expenditure on pensions, 2013-60

	2013-15	2020	2025	2030	2035	2040	2045	2050	2055	2060
OECD members										
Australia	4.0								3.7	
Austria	13.9	13.9	14.1	14.4	14.7	14.7	14.7	14.6	14.6	14.4
Belgium	11.8	11.8		12.3		13.0		12.9		13.0
Canada	5.5							6.9		
Chile	5.1							4.2		
Czech Republic	9.0	9.0	9.1	9.0	8.8	9.0	9.3	9.6	9.8	9.7
Denmark	10.3	8.7	8.4	8.3	8.2	8.0	7.7	7.5	7.3	7.2
Estonia	7.6	7.6	7.3	7.1	7.0	6.9	6.8	6.7	6.6	6.3
Finland	12.9	14.2	14.9	15.0	14.4	13.6	13.0	12.8	12.8	12.9
France	14.9	14.6	14.9	14.7	14.2	13.8	13.3	12.8	12.3	12.1
Germany	10.0	10.3	10.9	11.6	12.1	12.2	12.3	12.5	12.6	12.7
Greece	16.2	15.5	15.0	14.4	14.1	14.1	14.1	14.4	14.2	14.3
Hungary	11.5	9.8	9.3	8.9	9.1	9.6	10.4	10.7	11.0	11.4
Iceland	3.3							3.5		
Ireland	7.4	8.0	8.7	9.1	9.6	10.0	10.2	10.0	9.3	8.4
Israel	5.3							6.2		
Italy	15.7	15.3	15.5	15.7	15.8	15.8	15.5	14.8	14.2	13.8
Japan	10.2							9.5		
Korea	2.6							6.3		
Latvia	7.7	5.9	5.5	5.5	5.5	5.4	5.3	5.2	5.0	4.6
Luxembourg	9.4	10.6	11.2	11.9	12.4	12.7	12.7	12.5	12.4	13.4
Mexico	1.8							3.0		
Netherlands	6.9	7.1	7.4	7.7	8.1	8.3	8.3	8.1	7.9	7.8
New Zealand	4.7							7.2		
Norway	9.9	10.7	11.1	11.3	11.4	11.4	11.4	11.6	11.9	12.4
Poland	11.3	10.6	10.5	10.4	10.1	10.0	10.1	10.4	10.7	10.7
Portugal	13.8	14.6	14.9	15.0	15.0	14.8	14.6	14.4	13.8	13.1
Slovak Republic	8.1	8.0	7.9	7.6	7.7	8.1	8.6	9.1	9.7	10.2
Slovenia	11.8	11.1	11.4	12.3	13.3	14.3	15.1	15.6	15.6	15.3
Spain	11.8	11.8	11.4	11.2	11.5	11.9	12.5	12.3	11.4	11.0
Sweden	8.9	8.3	8.1	7.9	7.8	7.5	7.3	7.2	7.4	7.5
Switzerland	9.8							10.7		
Turkey	7.2							5.6		
United Kingdom	7.7	7.4	7.8	7.9	8.2	8.4	8.1	8.1	8.3	8.4
United States	4.9							5.9		
OECD	**8.9**							**9.5**		**10.9**
Argentina	7.8							10.4		
Brazil	9.1							16.8		
China	4.1							9.5		
India	1.0							1.0		
Indonesia	0.8							1.2		
Russian Federation	9.1							12.4		
Saudi Arabia	2.7							9.4		
South Africa	2.2							3.3		
EU28	11.3	11.2	11.4	11.6	11.7	11.7	11.6	11.4	11.3	11.2

Note: OECD28 figure shows only countries for which complete data between 2010-15 and 2050 are available. EU28 figure is a simple average of member states (not the weighted average published by the European Commission). Pension schemes for civil servants and other public-sector workers are generally included in the calculations for EU member states: see European Commission (2015), *2015 Ageing Report*.

Source: European Commission (2015), *2015 Ageing Report*; Standard & Poor's (2016), *Global Aging 2016: 58 Shades of Gray: Argentina, Brazil, Canada, Chile, China, India, Indonesia, Israel, Japan, Korea, Mexico, New Zealand, Russian Federation, Saudi Arabia, South Africa, Switzerland, Turkey and the United States;* Standard & Poor's (2013), *Global Aging 2013: Rising to the Challenge: Iceland; Australia: 2015 Intergenerational Report Australia in 2055*. Figures are based on the proposed policy as at the *2015 Intergenerational Report*. There have been significant changes to the proposed Age Pension and Disability Support Pension policy since then which would have an impact on these projections.

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Pensions at a Glance 2017
OECD and G20 Indicators

Chapter 8

Private pensions and public pension reserve funds

The range of indicators of private pensions and public pension reserves follows the format of the last edition of Pensions at a Glance.

The first of these seven indicators looks at the proportion of the working-age population covered by private pension plans. It distinguishes between mandatory, quasi-mandatory and voluntary schemes and between occupational provision, through an employer-provided or industry-wide scheme, and personal provision, arranged by an individual with a pension provider.

The diversity of pension plans is examined next. This second indicator shows the types of pension plan that can be found in OECD countries. This indicator provides a breakdown of pension assets between occupational defined benefit, occupational defined contribution and personal plans.

The third indicator reports assets in private pension plans and public pension reserves for the latest year available. The way these assets are invested is explored in the fourth indicator. There then follows an analysis of the investment performance of private pension plans and public pension reserve funds in 2016 and 2015 respectively.

The sixth indicator looks at the operating expenses of private pension systems and the fees pension providers charge to members in selected defined contribution plans.

The final indicator focuses on defined benefit funding ratios, which are presented over the period 2012-16.

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.

COVERAGE OF PRIVATE PENSION PLANS

Key results

In 2016, private pensions in 17 OECD countries achieved near-universal coverage through mandatory or quasi-mandatory (that is, covering employees in many sectors through collective bargaining agreements) plans. In ten OECD countries, voluntary private pensions (occupational and personal) covered more than 40% of the working-age population.

In 2016, 17 of the 35 OECD countries had some form of mandatory or quasi-mandatory private pension system in place, ensuring a high coverage of the working-age population. In Finland, Iceland and Switzerland, occupational pensions are mandatory and cover more than 70% of the working-age population: employers must operate a scheme and contribution rates are set by the government. Other occupational pension systems can be classified as quasi-mandatory: through industry-wide or nation-wide collective bargaining agreements, employers establish schemes that employees must join. As not all sectors may be covered by such agreements, these systems are not classified as mandatory (e.g. Denmark, the Netherlands and Sweden). In these countries, the coverage is close to the one in countries with mandatory systems.

Mandatory personal accounts systems are prevalent in Latin America and Central and Eastern Europe where they have partly replaced social security benefits. Such plans can be found in Chile, Estonia, Mexico and the Slovak Republic. Other OECD countries with such mandatory personal pensions include Denmark, Israel and Sweden (premium pension system). While coverage is nearly universal in Chile, Denmark, Estonia, Israel and Sweden, it is still not the case in the other countries, where older workers tend not to be covered by the new systems. The coverage rate of around 40-60% will therefore continue increasing over time as new workers join personal pensions. Some of these countries also have a high incidence of informal employment which limits coverage levels.

Coverage of voluntary occupational pension plans varies across countries. These plans are called voluntary in the sense that employers, in some countries jointly with employees, are free to set up an occupational plan. Personal pension plans are voluntary when individuals can freely decide whether to join them or not. The coverage of voluntary pension plans (occupational or personal) is above 40% in Belgium, the Czech Republic, Germany, Iceland, Ireland, Japan, New Zealand, Poland, the United Kingdom and the United States. On the other hand, the coverage of voluntary pension plans is very low (below 5%) in countries such as Greece. In Greece, the relatively high level of unemployment may partly explain the low private pension coverage.

Italy, New Zealand, Turkey and the United Kingdom have introduced automatic enrolment (with an opt-out clause) into private pension plans at the national level. The results have been mixed. New Zealand has achieved a coverage rate of 75% in the "KiwiSaver" scheme (introduced in 2007). In Italy, since 2007 the severance pay provision (so called *Trattamento di Fine Rapporto* – TFR) of private sector employees is automatically paid into an occupational pension plan unless the employee makes an explicit choice to remain in the TFR regime. Despite this rule, only 20% of the working-age population is covered by a voluntary pension plan in Italy. The United Kingdom has experienced a substantial increase in the coverage of the working-age population, from 34% in 2012/13 to 43% in 2015/16. The proportion of self-employed covered by a plan in the United Kingdom is however declining as they are not eligible for automatic enrolment. Turkey has also just introduced automatic enrolment in 2017, compelling employers with at least five employees to enrol all employees under 45 in a plan. Automatic enrolment is also encouraged by regulation in Canada and the United States.

Definition and measurement

The term "private pensions" actually refers to private pension arrangements (funded and book reserves) and funded public arrangements (e.g. ATP in Denmark).

Several measures of coverage coexist (see OECD, 2012, for a discussion of the different measures and their limitations). To be a member of a pension plan from the perspective proposed here, an individual must have assets or have accrued benefits in a plan.

Counting individuals more than once may arise when using administrative data as individuals can be members of both occupational and personal voluntary pension plans. Therefore total voluntary pension plan coverage cannot be obtained by summing occupational and personal coverage data.

Further reading

OECD (2012), *OECD Pensions Outlook 2012*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264169401-en*.

8.1. Coverage of private pension plans by type of plan, 2016

As a percentage of working-age population (15-64 years)

	Mandatory/Quasi-mandatory	Voluntary		
		Occupational	Personal	Total
Australia	75.7	x	..	..
Austria	x	13.9	18.0	..
Belgium	x	59.6	..	..
Canada	x	26.3	25.2	..
Chile	84.3	..	..	..
Czech Republic	x	x	52.6	52.6
Denmark	ATP: 84.0 QMO: 63.4	x	18.0	18.0
Estonia	81.4	x	12.3	12.3
Finland	89.8	6.6	19.0	25.6
France	x	24.5	5.7	..
Germany	x	57.0	33.8	70.4
Greece	x	1.3	..	..
Hungary	x	..	18.4	..
Iceland	85.1	x	45.2	45.2
Ireland	x	38.3	12.6	46.7
Israel	91.1	..	..	..
Italy	x	9.2	11.5	20.0
Japan	..	45.4	13.4	50.8
Korea	17.1	x	24.0	24.0
Latvia	~100	0.3	11.4	..
Luxembourg	x	5.1	..	..
Mexico	61.4	1.7	..	..
Netherlands	88.0	x	28.3	28.3
New Zealand	x	6.8	74.8	..
Norway	56.3	..	26.7	..
Poland	x	1.6	66.6	..
Portugal	x	3.7	4.5	..
Slovak Republic	36.1	x	19.0	19.0
Slovenia	x	..	..	37.8
Spain	x	3.3	15.7	18.6
Sweden	PPS: ~100 QMO: ~90	x	24.2	24.2
Switzerland	73.7	x	..	..
Turkey	1.5	1.0	13.9	..
United Kingdom	x	..	..	43.0
United States	x	40.8	19.3	..

Note: QMO = Quasi-mandatory occupational; PPS = Premium Pension System; ".." = Not available; "x" = Not applicable; "~" = Approximately. Coverage rates are provided with respect to the total working-age population (i.e. individuals aged 15 to 64 years old), unless specified otherwise in the detailed notes of this table.

Source: OECD Global Pension Statistics.

StatLink http://dx.doi.org/10.1787/888933634629

STRUCTURE OF PRIVATE PENSION SYSTEMS

Key results

The pension landscape includes various types of plan worldwide. Occupational and personal plans coexist in most OECD countries. In 2016, the size of occupational plans in terms of assets varied greatly across countries. In most cases, pension funds would administer these plans although there are some notable exceptions (e.g. Denmark, France). Personal plans and occupational defined contribution plans are gaining importance at the expense of occupational defined benefit plans.

The pension landscape includes various types of plan worldwide. For example, pension plans may be accessed through employment or by individuals directly without any involvement of their employers. When plans are accessed through employment and were established by employers or social partners on behalf of their employees, these plans are considered as occupational. The OECD taxonomy classifies plans as personal when access to these plans does not have to be linked to an employment relationship and these plans are established directly by a pension fund or a financial institution acting as pension provider without any intervention of employers.

Occupational and personal plans coexist in most reporting countries: 32 out of the 35 OECD countries have both occupational and personal plans. Individuals may be members of several occupational pension plans through different jobs during their career, and several personal pension plans that they have opened directly with a pension provider. The prominence of occupational plans in terms of assets varied greatly across countries in 2016.

Occupational pensions are overwhelmingly funded through pension funds in most OECD countries, the main exception being countries such as Belgium, Denmark, France, Korea, Norway and Sweden where pension insurance contracts play a large role, and Austria and Germany where book reserves – provisions on sponsoring employers' balance sheets – are one of the main types of financing vehicle for occupational pension plans. Personal pension plans are often funded through pension insurance contracts or financial products provided by banks and asset managers.

Depending on how pension benefits are calculated and who bears the risks, occupational pension plans can either be defined benefit (DB) or defined contribution (DC). In DC plans, participants bear the brunt of risk, while in traditional DB plans sponsoring employers assume all the risks. Employers in some countries have introduced hybrid and mixed DB plans, which come in different forms, but effectively involve some degree of risk sharing between employers and employees. For example, in the Netherlands, benefit levels may be conditional on the funding status of the pension provider. Cash balance plans (another type of hybrid DB plan) provide benefits based on a fixed contribution rate and a guaranteed rate of return (the guarantee is provided by the sponsoring employer, hence these plans are classified as DB). Such plans are part of the pension landscape in Belgium (where by law, employers must provide a minimum return guarantee), Japan and the United States. Mixed plans are those where the plan has two separate DB and DC components which are treated as part of the same plan. For instance, the plan may calculate benefits under a DC formula up to a certain age before retirement and apply a DB formula thereafter. There are also DC plans such as those in Denmark which offer guaranteed benefits or returns. They are classified as DC as there is no recourse to the sponsoring employer in case of underfunding.

The proportion of assets in DC plans and in personal plans is higher than in DB plans in most of the reporting countries. More than 50% of assets are held in DC plans or personal plans in 18 out of the 23 reporting OECD economies.

DC plans and personal plans are gaining prominence at the expense of DB plans even in countries with a historically high proportion of assets in DB plans such as the United States. The transition from DB plans to DC plans and personal plans is also under way in other countries. For example, in Ireland, the amount of assets in DB schemes declined from EUR 62 146 million in 2015 to EUR 61 465 million in 2016.

Definition and measurement

The term "private pensions" actually refers to private pension arrangements (funded and book reserves) and funded public arrangements (e.g. ATP in Denmark).

The OECD has established a set of guidelines for classifying private pensions (see OECD, 2005) on which this analysis is based.

Further reading

OECD (2005), *Private Pensions: OECD Classification and Glossary*, OECD, Paris, *www.oecd.org/dataoecd/0/49/38356329.pdf*.

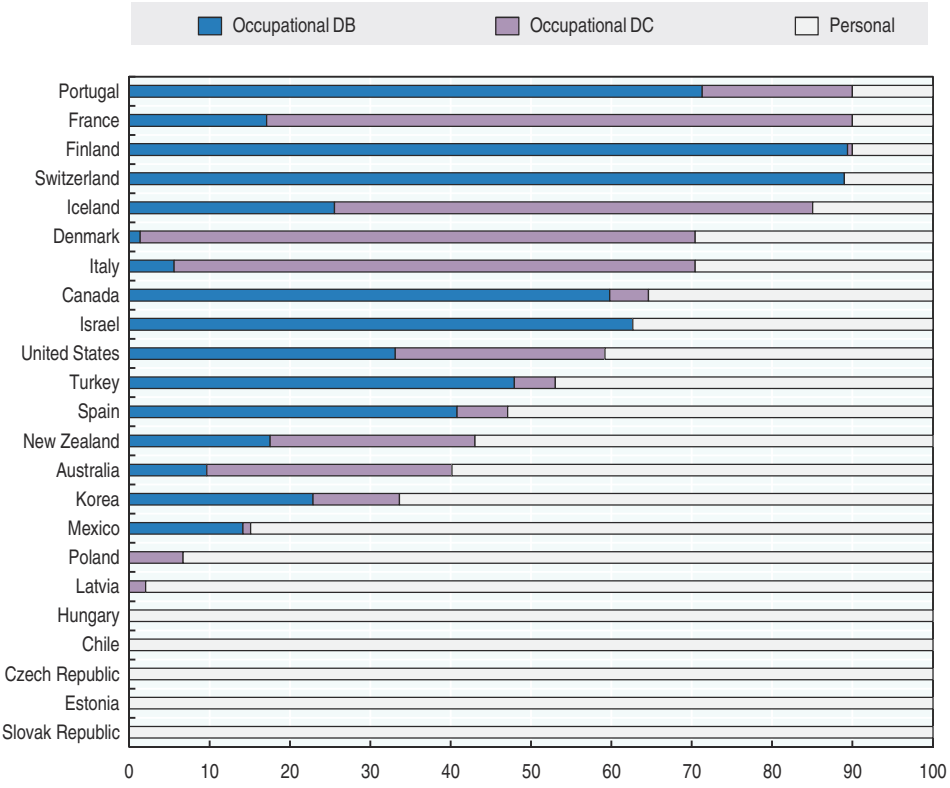
8.2. Types of pension plan available in the OECD area according to the OECD taxonomy, 2016

		Occupational plans			
		DB only	Both DB and DC	DC only	None
Personal plans	**Yes**	Finland, Germany, Israel, Switzerland	Australia, Austria, Belgium, Canada, Denmark, France, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, United Kingdom, United States	Chile, Greece, Hungary, Latvia, Poland, Slovenia	Czech Republic, Estonia, Slovak Republic
	No				

StatLink http://dx.doi.org/10.1787/888933634648

8.3. Split of pension assets by type of private pension plan in selected OECD countries, 2016

As a percentage of total investment



Source: OECD Global Pension Statistics.

StatLink http://dx.doi.org/10.1787/888933634667

ASSETS IN PRIVATE PENSION PLANS AND PUBLIC PENSION RESERVE FUNDS

Key results

Substantial assets have been accumulated in most OECD countries to help meet future pension liabilities. The weighted average of OECD assets in private pension plans was equal to 83% of gross domestic product (GDP) in 2016 (using GDP as weights). Eighteen OECD countries have also built up public pension reserves to help pay for state pensions. For these countries, public pension reserves were worth 19% of GDP on average in 2015.

Assets in private pension plans reached USD 38.1 trillion in 2016 in the OECD area. The United States had the largest pension market within the OECD member countries with assets worth USD 25.1 trillion, representing 65.9% of the OECD total. Other OECD countries with large pension systems include Canada with assets worth USD 2.4 trillion and a 6.3% share of OECD pension market in 2016; the United Kingdom, USD 2.3 trillion and 6.0%; Australia, USD 1.5 trillion and 4.0%; Japan, USD 1.4 trillion, 3.6%; and the Netherlands, USD 1.3 trillion and 3.5%.

The OECD average asset-to-GDP ratio, weighted according to the GDP of each country, was 83.0% in 2016. Seven OECD countries achieved asset-to-GDP ratios higher than 100% – Denmark (209.0%), the Netherlands (180.3%), Canada (159.2%), Iceland (150.7%), Switzerland (141.6%), the United States (134.9%) and Australia (123.9%). These countries put in place private pensions a long time ago, and with the exception of Canada and the United States, have mandatory or quasi-mandatory private pension systems.

Pension assets were of varying importance relative to GDP in the other countries. Nine OECD countries had asset-to-GDP ratios below 100% but above 20%. These include countries that have introduced mandatory funded pension systems in recent years. Of these, Chile has the longest history and has accumulated assets worth 69.6% of its GDP. Growth prospects are also very positive in countries like Estonia and Mexico, countries that introduced mandatory private pensions in the late 1990s and early 2000s. Assets have grown rapidly since that point, reaching between 15% and 20% of GDP respectively at the end of 2016. These figures will continue growing over the coming years and decades as more people join the new retirement-income system and existing members make further contributions.

Some prefunding also occurs in state pension systems, which are normally financed on a pay-as-you go basis. Public pension reserve funds (PPFRs) are expected to play a major role in the future financing of some public pension systems, alleviating the impact of population ageing on the public purse. By the end of 2015, the total amounts of PPRFs assets were equivalent to USD 5.1 trillion for the 18 OECD countries for which data are available. The largest reserve was held by the US social security trust fund at USD 2.8 trillion, accounting for 54.7% of total OECD assets, although the assets consist of non-tradable IOUs issued by the US Treasury to the social security trust. Japan's Government Pension Investment Fund was second at USD 1.1 trillion – 22.1% of the OECD total. Of the remaining countries, Korea, Canada and Sweden had also accumulated large reserves, respectively accounting for 8.5%, 4.8% and 2.9% of the total.

In terms of total assets relative to the national economy, on average, PPRF assets accounted for 13.9% of GDP in the OECD area in 2015. The highest ratio was observed for the Korean National Pension Fund with 32.8% of GDP. Other countries where the ratio was of a significant size included Luxembourg with 30.2%, Sweden with 29.5% and Japan with 25.8%. PPRFs in Australia, Belgium, Chile and Poland have been established relatively recently (between 2001 and 2006), explaining the low level of assets accumulated up to now. The expansion of this pool of assets should continue over the coming years, although some countries such as Spain have already started withdrawing some of the savings to cover social security deficits. The Irish National Pension Reserve Fund, converted in 2014 into the Ireland Strategic Investment Fund, does not qualify anymore as a public pension reserve fund as its mandate now goes beyond financing pay-as-you-go pension plans.

Definition and measurement

The term "private pensions" actually refers to private pension arrangements (funded and book reserves) and funded public arrangements (e.g. ATP in Denmark).

Private pension plans are pension plans administered by an institution other than general government. They may be administered directly by a private sector employer acting as the plan sponsor, a private pension fund or a private sector provider. In some countries, these may include plans for public sector workers.

Funded public arrangements are pension plans which are managed by a public institution.

PPRFs are reserves established by governments or social security institutions to support public pension systems, which are otherwise financed on a pay-as-you-go basis. The assets in such reserve funds form part of the government sector, broadly defined.

8.4. Assets in private pension plans and public pension reserve funds in OECD countries and other major economies, latest year available

As a percentage of GDP and in millions of USD

	Private pension plans, 2016		Public pension reserve funds, 2015	
	% of GDP	USD million	% of GDP	USD million
OECD members				
Australia	123.9	1 523 302	7.3	90 026
Austria	6.0	21 980	x	x
Belgium	6.9	30 612	5.2	23 439
Canada	159.2	2 403 874	17.0	249 215
Chile	69.6	174 480	3.6	8 112
Czech Republic	8.4	15 684	x	x
Denmark	209.0	611 895	x	x
Estonia	16.4	3 656	x	x
Finland	59.3	134 867	8.8	20 416
France	9.8	230 184	2.5	59 552
Germany	6.8	223 906	1.1	37 055
Greece	0.7	1 254	x	x
Hungary	4.3	5 105	x	x
Iceland	150.7	32 359	x	x
Ireland	40.7	118 322	x	x
Israel	55.7	177 293	x	x
Italy	9.4	165 238	x	x
Japan	29.4	1 354 754	25.8	1 137 247
Korea	26.9	364 634	32.8	436 950
Latvia	12.7	3 340	x	x
Luxembourg	2.9	1 659	30.2	17 215
Mexico	16.7	156 503	0.1	1 511
Netherlands	180.3	1 335 227	x	x
New Zealand	24.4	45 109	11.8	19 974
Norway	10.2	36 899	6.9	24 269
Poland	9.3	41 038	1.1	4 984
Portugal	10.8	21 092	7.9	15 350
Slovak Republic	11.2	9 523	x	x
Slovenia	7.0	2 963	x	x
Spain	14.0	164 241	3.0	35 362
Sweden	80.6	389 264	29.5	147 883
Switzerland	141.6	904 380	x	x
Turkey	4.8	35 217	x	x
United Kingdom	95.3	2 273 713	x	x
United States	134.9	25 126 592	15.4	2 812 510
OECD	**Simple: 50.0% Weighted: 83.0%**	**Total: 38 140 159**	**Simple: 11.7% Weighted: 13.9%**	**Total: 5 141 071**
Argentina	..	..	10.3	50 689
Brazil	22.9	439 507	x	x
China (People's Republic of)	1.5	159 357	2.7	294 820
India	1.1	23 472	4.6	101 247
Indonesia	1.8	17 035	..	..
Russian Federation	6.1	87 038	x	x
Saudi Arabia	..	..	..	..
South Africa	100.6	259 622	x	x

Note: ".." means not available; "x" means not applicable; "Simple" means simple average; "Weighted" means weighted average. The line "OECD" shows the total assets in millions of USD, the simple and weighted averages of assets as a percentage of GDP (using GDP expressed in USD to build weights) calculated on the reporting countries in the OECD area.

Source: OECD Global Pension Statistics and Annual Survey of Public Pension.

StatLink http://dx.doi.org/10.1787/888933634686

ALLOCATION OF PRIVATE PENSION ASSETS AND OF ASSETS IN PUBLIC PENSION RESERVE FUNDS

Key results

Pension providers and public pension reserve funds still invested mostly in traditional asset classes (primarily bonds and equities) at the end of 2016 and 2015 respectively. Proportions of equities and bonds varied considerably across countries but there is, generally, a greater preference for bonds.

In most OECD countries for which 2016 data were available, bonds and equities remained the two most important asset classes, accounting for over 80% of the portfolio of pension providers at the end of 2016 in 16 OECD countries. The combined proportion of bonds and equities relative to the total portfolio of pension providers at the end of 2016 was 99.2% for Chile, 97.4% for Mexico, 92.6% for Poland, 91.9% for Hungary, 91.4% for Greece, 91.1% for Norway, 90.4% for the Czech Republic, 89.4% for Luxembourg, 86.4% for Sweden, 83.9% for Latvia and the Netherlands, 82.5% for the Slovak Republic, 81.6% for the United States, 81% for Iceland and 80.5% for Slovenia. At the other extreme, this combined proportion was below or close to 50% for a few countries, including the United Kingdom (53.0%).

Proportions of equities and bonds varied considerably in the portfolio of pension providers across countries. Although there was, in general, at the end of 2016, a greater preference for bonds, the reverse was true in some OECD countries, such as Australia, where equities outweighed bonds by 51.1% to 10.2%; Finland by 37.1% to 30.6%; and the United States by 46.4% to 35.2% for instance.

Within the "bonds" category, public sector bonds, as opposed to corporate bonds, comprised a significant share of the combined direct (i.e. excluding investment via collective investment schemes) bond holdings of pension providers in many countries. For example, public sector bonds comprised 91.8% of total direct bond holdings in Hungary, 88.3% in Israel, 84.6% in the Czech Republic, and 82.2% in Turkey, but only 26.4% in Norway, 17.8% in New Zealand, and 11.9% in Poland.

Cash and deposits also accounted for a significant share of pension providers' portfolios in some OECD countries. For example, the proportion of cash and deposits in total portfolio at the end of 2016 was as high as 23.3% for Estonia and 24.5% for Turkey.

In most OECD countries, loans, real estate (land and buildings), unallocated insurance contracts and private investment funds (shown as "other" in the chart) only accounted for relatively small amounts of the investments of pension providers although some exceptions exist. Real estate, for example, was a significant component of pension providers' portfolios (directly or indirectly through collective investment schemes) in Australia, Canada, Finland, Portugal and Switzerland (in the range of 5 to 20% of total assets).

Fixed income and equities were also the predominant asset classes within PPRF portfolios at the end of 2015. There was also a strong equity bias in some reserve funds, which reflects their long-term investment outlook and generally greater investment autonomy. For example, in 2015, Norway's Government Pension Fund invested 55.2% of its assets in equities and 40.1% in fixed income, while the figures for Sweden AP funds were on average around 45% for equities and 30% for fixed income (AP1, AP2, AP3 and AP4 funds), 42.0% and 21.5% for the Quebec Pension Plan. The reserves in the Canada Pension Plan Investment Board (CPPIB) were roughly evenly split between equities (32.3%) and fixed income (26.7%). On the other hand, reserve funds in Chile, Portugal and Poland for instance invested much more in bonds than equities in 2015.

The extreme cases are those of the Belgian, Spanish and US PPRFs, which are by law fully invested in government bonds.

Some PPRFs also started to invest in real estate and non-traditional asset classes like private equity and hedge funds. For example, the funds with the highest allocation to private equity and hedge funds were those in Mexico (45.6% in total in 2015) and Australia (23.5%).

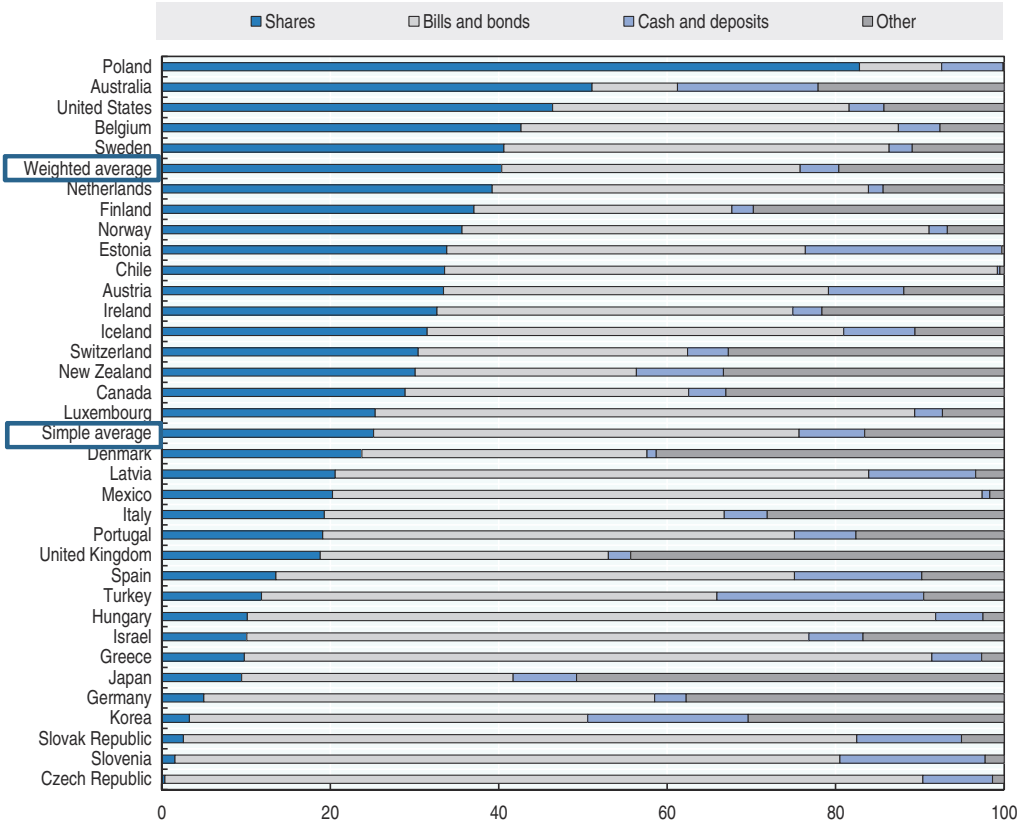
Definition and measurement

The term "private pensions" actually refers to private pension arrangements (funded and book reserves) and funded public arrangements (e.g. ATP in Denmark).

Asset allocation data include both direct investment in shares, bills and bonds and cash and deposits, and indirect investment through Collective Investment Schemes (CIS). The OECD Global Pension Statistics exercise collects data on investments in CIS, as well as the look-through of these investments in cash and deposits, bills and bonds, shares and other. When the look-through was not provided by the countries, estimates were made assuming that CIS investment allocation in cash and deposits, bills and bonds, shares and other was the same as pension providers' direct investments in these categories.

8.5. Allocation of private pension assets in selected OECD countries, 2016

As a percentage of total investment

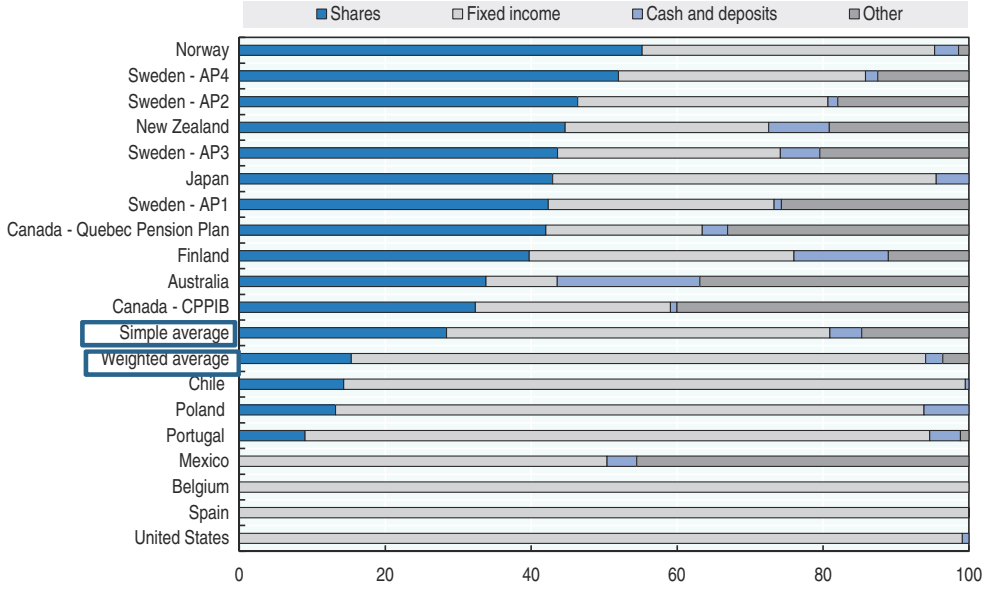


Source: OECD Global Pension Statistics.

StatLink http://dx.doi.org/10.1787/888933634705

8.6. Allocation of assets in public pension reserve funds in selected OECD countries, 2015

As a percentage of total investment



Source: OECD Annual Survey of Public Pension Reserve Funds.

StatLink http://dx.doi.org/10.1787/888933634724

INVESTMENT PERFORMANCE OF PRIVATE PENSIONS PLANS AND PUBLIC PENSION RESERVE FUNDS

Key results

Despite volatility created by international developments in financial markets, private pensions experienced positive rates of return in most OECD countries in 2016. During 2016, pension providers recorded positive real investment rates of return, with an OECD weighted average at 2.4%. All public pension reserve funds experienced positive returns in 2015.

Despite volatility created by international developments such as the Brexit vote, private pension plans achieved positive returns in most OECD countries in 2016.

In 2016, private pension plans experienced on average a real investment rate of returns net of investment expenses of more than 2% in the OECD area. The best performing private pension plans in 2016 could be found in Europe, in particular: Poland (8.3%), Ireland (8.1%), the Netherlands (7.2%) and Slovenia (6.9%). Private pension plans in Denmark also achieved a real return above 5%, due to the investments of pension assets in equities, alternative investments and high yield credit according to Danish authorities. Only three countries reported a negative investment return in real terms in 2016: Iceland (-0.3%), Mexico (-0.4%) and the Czech Republic (-1.2%). As the real net investment return is the combination of the nominal performance of the plans and inflation, a low figure can be accounted for by either low gains and income or inflation. Private pension plans in the Czech Republic, Iceland and Mexico all experienced positive returns in nominal terms in 2016 (0.8%, 1.6% and 2.9% respectively), but lower than inflation (2.0%, 1.9% and 3.4% respectively).

All PPRFs performed positively during the latest year available (2015), with an average (weighted by the assets managed at the end of the year) net investment rate of return of 3.2% in real terms. The highest performers in 2015 were in Canada (14.1% for the CPPIB, 8.8% for the Quebec Pension Plan), Chile (8.1%) and Sweden (12.1% for AP6, 6.7% for AP3 and AP4). Only Poland's Demographic Reserve Fund experienced a return below 1% in 2015 (0.5%).

Definition and measurement

The term "private pensions" actually refers to private pension arrangements (funded and book reserves) and funded public arrangements (e.g. ATP in Denmark).

Real (after inflation) returns are calculated in local currency before tax but after investment management expenses.

The average nominal net investment returns of private pension plans are the results of a calculation using a common formula for all the countries except for: Ireland, Israel, Sweden, Turkey and the United States for which values have been provided by the jurisdictions using their own formula or are from national official publications. The common formula corresponds to the ratio between the net investment income at the end of the year and the average level of assets during the year.

For PPRFs, nominal returns have been provided by the funds directly, using their own formula and methodology.

Returns over one year may not accurately reflect long-term performance. Pension assets are invested over 30 to 40 years, it is therefore important to assess performance over a longer time period than only one year. Average annual returns over longer time period are available in other OECD publications (OECD, 2017a, 2017b).

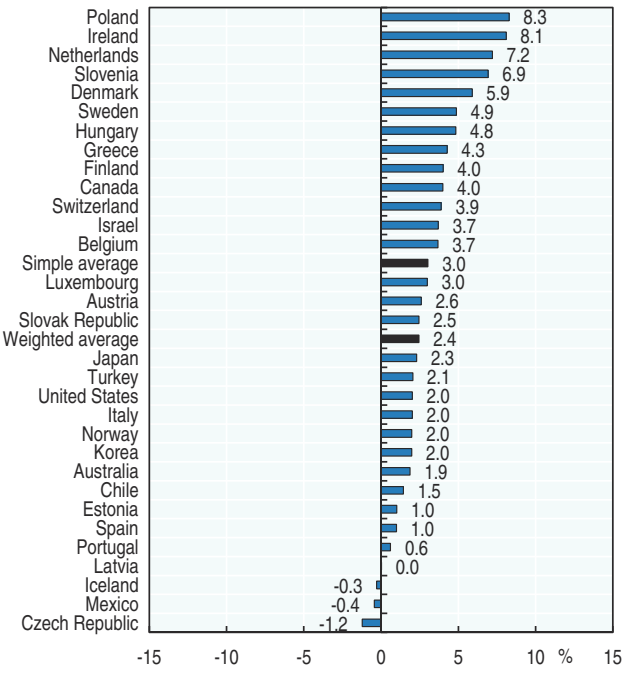
Further reading

OECD (2017a), "Pension Markets in Focus 2017", OECD, Paris, *www.oecd.org/pensions/private-pensions/Pension-Markets-in-Focus-2017.pdf*.

OECD (2017b), "Annual Survey of Large Pension Funds and Public Pension Reserve Funds. Report on Pension Funds' Long-term Investments", OECD, Paris, *www.oecd.org/daf/fin/private-pensions/2015-Large-Pension-Funds-Survey.pdf*.

8.7. Real investment rates of return of private pension plans, net of investment expenses, December 2015-December 2016

In per cent

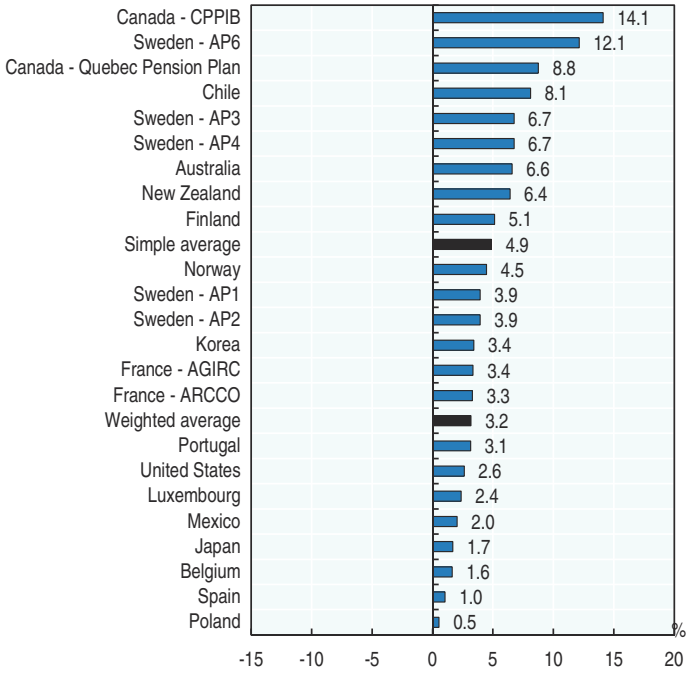


Source: OECD Global Pension Statistics.

StatLink http://dx.doi.org/10.1787/888933634743

8.8. Real investment rates of return of PPRFs, net of investment expenses, December 2014-December 2015

In per cent



Source: OECD Annual Survey of Public Pension Reserve Funds.

StatLink http://dx.doi.org/10.1787/888933634762

OPERATING COSTS OF PRIVATE PENSION SYSTEMS AND FEES CHARGED TO MEMBERS

Key results

The efficiency of private pension systems, as measured by the total operating costs in relation to assets managed, varied considerably across countries in 2016, ranging from 0.1% of assets under management annually to 1.5%. Fees charged to plan members to cover these costs also varied considerably in structure and level across countries.

The efficiency of pension providers in offering and running private pension plans can be judged by looking at the total operating costs in relation to assets managed. The total operating costs of private pension systems include all costs of administration and investment management involved in the process of transforming pension contributions into retirement benefits.

Operating costs of private pension systems reported by a selection of OECD countries ranged from 0.1% of assets to 1.5% in 2016. In general, countries with defined contribution and personal plans, and those with large numbers of small funds appear to have higher operating costs than countries with only a few funds offering defined benefit, hybrid, or collective defined contribution pension plans. For instance, operating costs accounted for 1.5% of assets under management in Latvia, 1.3% in the Czech Republic, 1.1% in Spain, 1.0% in Estonia, 0.8% in Australia, and 0.7% in Greece and the Slovak Republic. On the other hand, they accounted for less than 0.3% of total assets in Belgium (0.3%), Portugal (0.3%), Italy (0.2%), Norway (0.2%), Iceland (0.2%), Chile (0.2%, investment expenses only), Denmark (0.2%), Luxembourg (0.2%), the United Kingdom (0.2%), Germany (0.2%) and the Netherlands (0.1%).

In defined contribution and personal private pension systems, providers cover their operating costs through the fees they charge to plan members. The structure of charges across countries is fairly complex. The analysis considers fees in selected countries only. While there is a tendency for countries from the same region (e.g. Latin America, Central and Eastern Europe) to have similar fee structures, they can vary greatly across wider geographical regions.

Fees can either be fixed or variable. Fixed fees are characterised by the fact that their levels depend neither on salaries nor on funds. A variable fee may take the form of a percentage of the inflow of contributions, of the amount of assets managed, or of the investment return on the assets under management.

Variable fees on contributions can be expressed as percentages of salaries or as percentages of contributions. They can be found in Chile (for mandatory plans), Hungary, Israel, Latvia, Poland, the Slovak Republic (2nd pillar plans), Slovenia and Turkey for instance. Such fees on contributions are not charged in the Czech Republic, Estonia, Mexico and Spain. In Mexico, as of March 2008, Afores may only charge a fee on assets, while before that date they could charge fees both on assets and on contributions.

A variable fee on the stock of funds can be levied either on the value of the fund or on returns. Such fees may encourage pension companies to seek higher investment returns. Fees on assets can be found in all countries presented in the table, for some types of plans at least. Some countries charge both fees on assets and returns such as the Czech Republic, Poland and the Slovak Republic.

On top of the regular fees, members in some countries may also be charged fees when they join, switch or leave a pension provider (e.g. the Slovak Republic, Slovenia and Turkey).

Definition and measurement

The term "private pensions" actually refers to private pension arrangements (funded and book reserves) and funded public arrangements (e.g. ATP in Denmark).

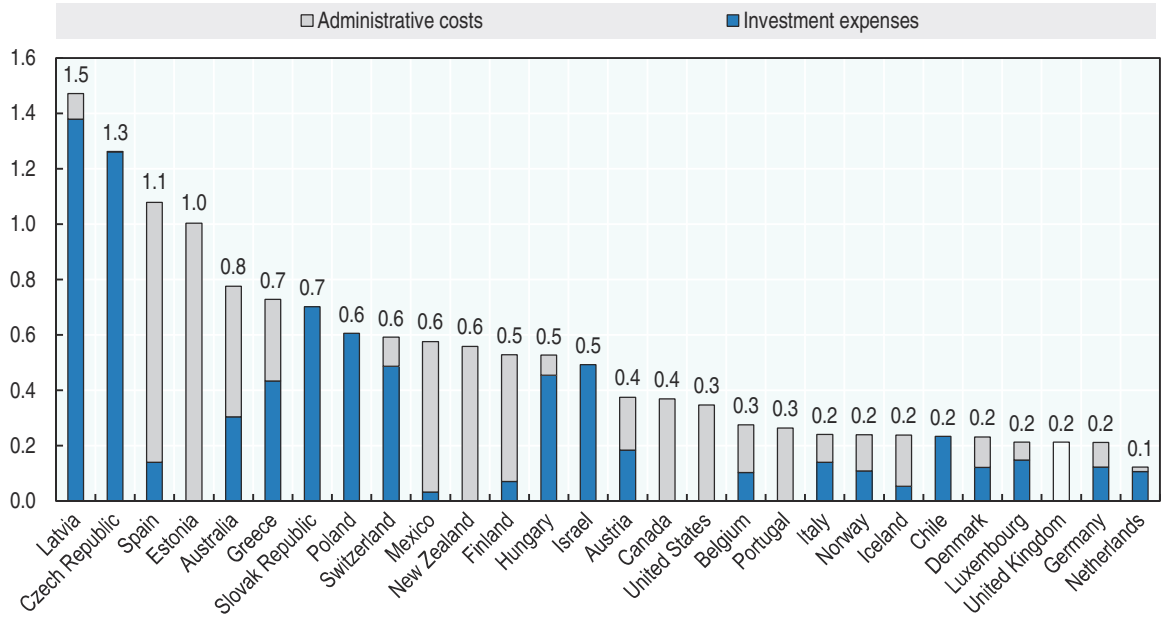
Operating costs include marketing the plan to potential participants, collecting contributions, sending contributions to investment fund managers, keeping records of accounts, sending reports to participants, investing the assets, converting account balances to annuities, and paying annuities.

The comparability of data on costs depends on the types of costs for which data are available in each country. It may be hampered if some costs are not reported, like for example indirect costs (e.g. commissions to brokers) which may be more difficult to collect.

Some fees may not be fully reported in all the cases either. For example, in Chile pension funds that invest in international mutual funds deduct management costs directly from the fund. These costs are reported separately by each pension fund administrator to the Superintendence of Pensions. However, they are not included in the fees charged to members.

8.9. Operating expenses of private pension systems in selected OECD countries, 2016

As a percentage of total investment



Source: OECD Global Pension Statistics.

StatLink http://dx.doi.org/10.1787/888933634781

8.10. Fees or commissions charged to members by type of plan and by type of fee in selected OECD countries, 2016

As a percentage of total investment

	Fee on salaries	Fee on contributions	Fee on assets	Fee on return/ performance	Other fees (e.g. exit, entry, switching fees)
Chile Mandatory personal plans	0.6	x	x	x	x
Chile Voluntary personal plans	x	x	0.8	x	x
Czech Republic	x	x	0.7	0.1	..
Estonia Mandatory plans	x	x	1.2	x	0.0
Hungary Voluntary personal plans in pension funds	x	0.4	0.4	x	..
Israel DC plans	x	0.4	0.3	x	x
Latvia Mandatory state funded pension schemes	x	0.0	1.4	..	x
Latvia Voluntary occupational plans	x	0.5	0.3	..	x
Latvia Voluntary personal plans	x	0.8	1.2	..	x
Mexico Personal plans	x	x	1.0	x	x
Poland Open pension funds	x	0.0	0.5	0.0	x
Slovak Republic 2nd pillar	x	0.1	0.3	0.2	x
Slovak Republic 3rd pillar	x	x	1.3	0.0	0.1
Slovenia Mutual pension funds	x	..	0.8	x	0.5
Slovenia Pension and insurance companies	x	1.2	x	x	0.2
Spain Occupational plans in pension funds	x	x	0.2	x	x
Spain Personal plans in pension funds	x	x	1.3	x	x
Turkey Personal plans	x	0.3	1.5	x	0.4

Note: ".." = Not available; "x" = Not applicable.
Source: OECD Global Pension Statistics.

StatLink http://dx.doi.org/10.1787/888933634800

DB FUNDING RATIOS

Key results

Despite the prolonged low interest rate environment, average funding ratios of defined benefit pension plans have remained relatively steady over the last years. These ratios were however still below 100% at the end of 2016 in Canada, Iceland, Mexico, the United Kingdom and the United States, suggesting that the value of assets in DB plans would not enable to cover pension liabilities. Funding levels are calculated using national (regulatory) valuation methodologies and hence cannot be compared across countries.

Providers of occupational defined benefit (DB) plans have faced challenges coming from low and falling interest rates over the last years. A significant part of OECD pension assets is still in DB plans and other plans which offer return or benefit guarantees. Falling interest rates may increase the values of liabilities of the providers of benefit promises (which depend on a discount rate generally based on long-term government bond yields) and can lower the amount of assets accumulated as fixed income securities (including long-term government bonds) represent an important part of pension providers' portfolios.

Funding ratios which measure the amount of assets over liabilities remained relatively stable over the last years in most countries with DB plans. In Belgium, Canada and Ireland, providers of DB plans have improved their funding position, increasing the average funding ratio by 27 percentage points in Belgium (from 126% in 2012 to 153% in 2015), by 26 percentage points in Canada (from 69% in 2012 to 95% in 2016) and by 9 percentage points in Ireland (from 96% in 2013 to 104.5% in 2016). The opposite trend can be observed in Mexico and Portugal where providers of DB plans saw their funding position decline by 2 percentage points in Mexico (from 54.9% in 2014 to 52.9% in 2016) and 3 percentage points in Portugal (from 106% in 2012 to 103% in 2016). The funding ratio in the other reporting countries has improved by less than 4 percentage points compared to 2012.

Funding levels were still below 100% in five reporting countries at the end of 2016. Providers of DB plans were underfunded at the end of 2016 in Canada, Iceland, Mexico, the United Kingdom and the United States. For Iceland, the low funding ratio refers to pension funds for public sector workers. Iceland passed a bill at the end of 2016 to transform DB pension funds covering the A-division of civil servants into defined contribution funds.

Funding levels are calculated using national (regulatory) valuation methodologies and hence cannot be compared across countries. Differences in methodology are substantial as some countries like Germany use fixed discount rates while others like the Netherlands use market rates. Discount rates can have a major impact on funding levels. Pension funds in the Netherlands can use an ultimate forward rate (UFR) for long maturities as the discount rate. Since 2015, the UFR is set at the 10-year moving average of the 20-year forward interest rate and is therefore tied to market expectations about future long-term interest rates.

Definition and measurement

The level of funding, that is, the ratio of pension plan assets to liabilities, is estimated using country-specific methodologies. Methodologies differ across countries with respect to the formula used, the discount rate (e.g. a market discount rate, or a fixed discount rate), or with the way future salaries are accounted for (e.g. liabilities can be based on current salaries or on salaries projected to the future date that participants are expected to retire). In addition, some countries calculate a funding ratio for each pension provider and calculate an average (simple or weighted) thereafter, while other countries only calculate an aggregate funding ratio for the whole industry.

8.11. Average funding ratio of occupational DB pension plans in selected OECD countries, 2012-16

In per cent

Source: OECD Global Pension Statistics and other sources.

StatLink http://dx.doi.org/10.1787/888933634819

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