

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, etc. However, 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>



From:
Pensions at a Glance 2017
OECD and G20 Indicators

Access the complete publication at:
https://doi.org/10.1787/pension_glance-2017-en

Please cite this chapter as:

OECD (2017), "Methodology and assumptions", in *Pensions at a Glance 2017: OECD and G20 Indicators*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/pension_glance-2017-11-en

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