

### Introduction

The indicators of pension entitlements that follow here in Part II.2 and the analysis of pension “savings gaps” in Part II.6 use the OECD pension models. The methodology and assumptions are common to the analysis of all countries, allowing the design of pension systems to be compared directly. Future entitlements under today’s parameter and rules.

The pension entitlements that are presented are those that are currently legislated in OECD countries. Changes in rules that have already been legislated, but are being phased-in gradually, are assumed to be fully in place from the start. Reforms that have been legislated since 2008 are included where sufficient information is available.

The values of all pension-system parameters reflect the situation in the year 2008. Where reforms have taken place more recently, parameters have been re-calculated for 2008 values assuming that the changed rules were already in place.

The calculations show the pension entitlements of a worker who enters the system today and retires after a full career. The main results are shown for a single person. However, replacement rates for married couples are also presented, though they are based on 2006 rules.

### Career length

A full career is defined here as entering the labour market at age 20 and working until the standard pension-eligibility age, which, of course, varies between countries. 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, 47 with retirement at 67, etc. Age 20 is approximately the average age of labour-market entry in OECD countries, although obviously some countries lie above and below this average. (Sensitivity analysis for situations where workers entered the labour market at age 25 rather than age 20, and so had a five-year shorter career, were presented in the 2007 edition of *Pensions at a Glance*.)

Although the main indicators show people working until the normal pension age, Chapter 3 in Part I on “Pension incentives to retire” shows calculations for people retiring both before and after the normal pension age.

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

country profiles in Part III of this report. The OECD pension models include these rules. For reasons of space, the results are not presented here.

### 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 in 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. There is also an analysis of pension “savings gaps”: how much people in countries with relatively small public pensions would need to save for old age.

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 twice the economy-wide average. 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, wage growth 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 2.5% per year. In practice, this assumption has little effect on the results because of indexation.

**Real earnings growth** of 2% per year (given the assumption for price inflation, this implies nominal wage growth of 4.55%). **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. **Earnings distribution** data from the *OECD Database* are used in some composite indicators: see the indicator of “Average earnings” in Part II.5).

The **real rate of return** after administrative charges on funded, defined-contribution pensions is assumed to be 3.5% per year.

The **discount rate** (for actuarial calculations) is assumed to be 2% per year. The discount rate is set at the same rate as real earnings growth, which is a common finding of growth models and other dynamic economic models (See Queisser and Whitehouse, 2006 for a discussion of the discount rate.)

The baseline modelling uses country-specific projections of **mortality rate** from the *United Nations Population Database for the Year 2050*.

Changes in these baseline assumptions will obviously affect the resulting pension entitlements. The impact of variations in economy-wide earnings growth, and for individual earnings growing faster or slower than the average, was shown in the first edition of *Pensions at a Glance* (OECD, 2005). The impact of different rates of return is assessed in the indicator on “Investment risk and replacement rates”).

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. This is calculated from the mortality projections. 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.

### 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 available in the online country profiles from the website: [www.oecd.org/els/social/pensions/PAG](http://www.oecd.org/els/social/pensions/PAG).

The modelling assumes that tax systems and social-security contributions remain unchanged in the future. This implicitly means that “value” parameters, such as tax allowances or contribution ceilings, are adjusted annually in line with average 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 2008 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.

### References

- D’Addio, A., J. Seisdedos and E.R. Whitehouse (2009), “Investment Risk and Pensions: Measuring Uncertainty in Returns”, *Social, Employment and Migration Working Paper*, No. 70, OECD Publishing, Paris.
- OECD (2009), *Taxing Wages*, OECD Publishing, Paris.
- Queisser, M. and E.R. Whitehouse (2006), “Neutral or Fair? Actuarial Concepts and Pension-System Design”, *OECD Social, Employment and Migration Working Paper*, No. 40, OECD Publishing, Paris.
- Whitehouse, E.R., A.C. D’Addio and A.P. Reilly (2009), “Investment Risk and Pensions: Impact on Individual Retirement Incomes and Government Budgets”, *Social, Employment and Migration Working Paper*, No. 87, OECD Publishing, Paris.



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