PART II

Pension Reforms and Private Pensions

This part presents two special chapters on pension reforms and private pensions. Both chapters use the OECD pension models to explore more deeply the central issues of pension policy in national debates.

The framework of Pensions at a Glance *is forward-looking, focusing on future pension entitlements of today's workers. However, the past decade has seen intense reform activity in the world of pensions and retirement in many OECD countries. The first special chapter looks at what countries did and how this is likely to affect future benefits.*

A number of these reforms have increased the role of the private sector in pension provision. The second special chapter identifies the complex range of private retirement arrangements and quantifies the savings effort necessary to maintain standards of living in retirement.

1. A Decade of Pension Reforms: The Impact on Future Benefits

In the past decade, around half of OECD countries have either undertaken far-reaching reforms that have changed the structure of their pension systems or adopted a series of smaller reforms which, taken together, often also have had a substantial impact on future pension entitlements.

This special chapter discusses the most important pension reforms that took place in OECD countries since the early 1990s. It starts with an overview of the types of reform measures taken. This is followed by an analysis of the impact of these reforms on pension entitlements. The effect is measured, using the OECD pension models, by comparing standard indicators of pension systems. There have been numerous studies of the effect of pension reform on the public finances,[1] but only a few have explicitly considered the social impact of changing retirement-income regimes, on equity and the distribution of income, for example.[2]

Four key impacts of pension reforms are explored. The first is the *financial impact*: how much smaller will future benefits be for workers entering the labour market today compared with earlier generations? The second is the *distributional impact* of reform: how will different groups be affected by pension reforms? The third looks at the *structure of pension systems*: how has responsibility for pension provision been rebalanced between public and private sectors? A fourth motive for pension reform has been to raise *work incentives*, *i.e.* encourage people to work longer.

1.1. Overview of pension reforms in OECD countries

Table II.1.1 summarises the elements of major reforms to retirement income systems since 1990, with five main categories of change identified. Some 17 OECD countries had major reforms that affected the entitlements of the standard, full-career worker over this period. In the other 13 countries, changes were less significant in their impact: for example, changing pension ages only for women or adjusting benefits for early or late retirement alone. The empirical results in Section 1.2 below look at 16 of the 17 countries with substantial changes. The only major reform not analysed is the introduction of mandatory defined-contribution (DC) pensions in Australia.[3]

Increasing pension eligibility age

Most OECD countries now have a standard retirement age of 65 years for men. In Iceland, Norway and the United States, the pension eligibility age is either already 67 or it is being increased to this age. Denmark, Germany and the United Kingdom are in the process of legislating increases. France is the member country with the lowest pension eligibility age: 60 years.

Several countries, including Australia, Belgium, Portugal and the United Kingdom, will equalise retirement ages for men with those of women. Following reforms, only Italy, Mexico, Poland and Switzerland currently plan to have different pension ages for women than men in the long term. In the Czech Republic, the retirement age for women depends on the number of children.

Increases in pension age that affect both men and women are being implemented in the Czech Republic, Greece, Hungary, Italy, Japan, Korea and the United States.

Increasing pension eligibility ages will improve *financial sustainability* and *retirement incentives*. However, there may be a *social cost* to such reforms if they penalise those who are forced to retire early through no fault of their own.

Increasing the reward for continuing in work

Penalties for early retirement or increases in the number of years of contributions required to receive a full pension have been introduced or increased in many countries, as described in *Live Longer, Work Longer* (OECD, 2006b). Similarly, others have introduced or increased the increments or bonuses paid to people retiring after the normal pension age. The measures aim to reduce early pension benefits by an amount that corresponds both to the lower amount of contributions paid by the worker and to the increase in the period over which the worker will receive pension payments (see Whitehouse, 2007a; Queisser and Whitehouse, 2006).

In Australia, a new lump-sum bonus was introduced as an incentive for older workers to remain in the labour force for a longer time. In Finland, older workers are given higher accrual rates while in Hungary the previously higher accrual rates for younger workers were reduced to a uniform level for all workers. Austria, France, Germany, Portugal and the United States all changed the benefit reductions and increments for early and late retirement, respectively. In the United Kingdom, the public pension now offers a larger increase for workers who stay in work beyond the standard retirement age.

These measures to improve *retirement incentives* should increase *financial sustainability*. By improving equity between workers who retire at different ages, the *social and distributional effect* can also be positive.

Changes in the way earnings are measured to calculate benefits

Many earnings-related schemes used to calculate benefits with respect to only a few years of final or best earnings. Seven OECD countries have extended the period over which earnings are measured since 1990. France is moving from the best 10 years to the best 25 years in the public scheme. Austria is gradually extending the averaging period from the 15 to the 40 best years. Finland, Poland, Portugal and Sweden are all moving to a lifetime average earnings measure. The largest change happened in the Slovak Republic where the earnings measure used to be the best five in the final 10 years of earnings; it will now be lifetime average earnings. As a result of these reforms, most OECD countries – 17 out of the 22 with the relevant kinds of scheme – now use a lifetime earnings measure or a close proxy for it.

The impact of changes in the earnings measure on pension benefits depends on how much earnings rise over the career of a worker (see below). If earnings stay stable over the whole career, changes in the earnings measure will not affect entitlements. But for workers with steeply rising earnings, the impact can be substantial.

Extending the period over which earnings are measured will tend to cut pension benefits. The average of the best years or final earnings is usually higher than the average over the lifetime because the latter also takes earlier years with lower earnings into account. Such reform will improve *financial sustainability*.

The *social effects* of such changes are more complex. Individuals who are most affected are those whose earnings rise more steeply with age. These people tend to be higher paid workers and, usually, men. Low-skilled workers typically have flatter real age-earnings profiles, as do women (OECD, 2006b, Figure 3.4).

Changing the valorisation of past earnings

In all earnings-related public pension systems of OECD countries, past earnings are re-valued to take account of changes in living standards between the time pension rights accrued and the time they are claimed. This process is here called "valorisation" although it is also known as pre-retirement indexation.

The majority of OECD countries with earnings-related schemes valorise past earnings in line with economy-wide wage growth. However, several OECD countries have moved away from earnings valorisation in recent years. For example, France moved to price valorisation in the public scheme as early as 1985 and in the occupational schemes in 1996. Finland, Poland and Portugal valorise past earnings with a mix of wage and price growth; recent reforms have changed the weights of price and earnings inflation in the valorisation formula used in Finland and Poland.

Valorisation of past earnings has a large effect on the value of pension benefits. A generic example illustrates the impact of changes in valorisation policy: average real wage growth of 2% and price inflation of 2.5% is assumed, implying a 4.5% annual increase in nominal earnings. For a full-career worker, *i.e.*, someone working from age 20 to 65, valorising past earnings with prices results in a pension benefit on retirement that is 40% lower than a pension resulting from valorisation in line with economy-wide average earnings. This is due to the "compound-interest" effect: when their past earnings are re-valued workers lose out each year of their career compared to the evolution of their wages.

Again, *financial sustainability* is improved by a move to a less generous valorisation procedure. The *social effects* are the opposite of those arising from the extension of the period over which earnings are measured to calculate benefits (see above). People with steeper age-earnings profiles will tend to lose less from a shift to prices valorisation than those with relatively constant real earnings. This is because prices valorisation puts a lower weight on earlier years' earnings (which are less important for a worker with a steep age-earnings profile) than does earnings valorisation.

Linking pensions to higher life expectancy

Systemic reforms that established defined-contribution (DC) schemes or mechanisms that adjust benefits or the pension age to increasing life expectancy have been proposed or implemented in around half of OECD countries (see Whitehouse, 2007b).

DC schemes – whether they are funded or notional – automatically adjust benefits to life expectancy. Pension capital is accumulated in an individual account and needs to be transformed into a regular pension payment, an annuity, at retirement. Annuity benefits will be lower, the higher life expectancy is at the time of retirement because of the longer expected duration of the pension payment. Since the late 1990s, Hungary, Poland, the

Table II.1.1. **Reforms to national retirement income systems since 1990 in OECD countries**

	Pension eligibility age	Adjusted retirement incentives	Change of years in benefit formula or qualifying conditions	Link to life expectancy and/or financial sustainability	Defined contribution scheme	Other
Australia	Pension age for women rising from 60 to 65. Increase from 55 to 60 in age to access private pensions.	New lump-sum bonus for deferring public pension.		Through annuity calculation in DC scheme.	Mandatory DC scheme introduced in addition to public pension.	Lower withdrawal rate for income test in the public pension.
Austria	Early retirement age increased by 1.5 years. Pension corridor between 62 and 65. Pension ages for women aligned with those of men.	Benefit reduction for early retirement introduced and set to increase. Tighter access to early retirement.	Best 15 years to 40 years.	Introduction of sustainability factor under discussion.		Reduction in accrual rate. Less generous indexation for higher pensions.
Belgium	Pension age for women aligned with that for men.	Pension bonus for workers above age 62 Different accounting for work and credit periods Fiscal incentive to take-up private pensions only at standard pension age.	Contribution condition for early retirement at 60 tightened.			
Canada						Pre-funding of earnings-related plan.
Czech Republic	Phased increase in normal pension age to 63.	Changes in increments and reductions for early/late retirement.				
Denmark	Phased increase in normal pension age from 65 to 67.			Normal pension age linked to life expectancy.		
Finland		Increased accrual rate for people working age 63-67.	10 last years to lifetime average.	Life-expectancy multiplier (from 2010).		Basic part of national pension income-tested. Higher valorisation of past earnings and lower indexation of pensions in payment.
France		Changes in adjustment to benefits for early/late retirement in public and occupational pensions.	Minimum contribution period increased. Earnings measure in public scheme from best 10 to best 25 years.	Minimum contribution period to increase further with changes in life expectancy.		Targeted minimum income of 85% of minimum wage. Valorisation now effectively to prices in both plans.
Germany		Reduction in benefits for retirement before 65.		Valorisation and indexation cut back as system dependency ratio worsens.	Voluntary DC pensions with tax privileges.	Phased abolition of favourable tax treatment of pension income.
Greece	Pension age rising from 58 to 65.					

	Pension eligibility age	Adjusted retirement incentives	Change of years in benefit formula or qualifying conditions	Link to life expectancy and/or financial sustainability	Defined contribution scheme	Other
Hungary	Gradual increase in pension age from 55 for women and 60 for men to 62 for both.	Accrual rates linear rather than higher for earlier years.	Pension calculation based on gross rather than net earnings.	Through annuity calculation in DC scheme.	DC scheme: mandatory for new entrants, voluntary for existing workers.	Minimum pension to be abolished. Less generous Indexation of pensions in payment. Pensions subject to income tax.
Iceland	No significant changes since 1990					
Ireland					Incentives for voluntary retirement savings.	Pre-funding of public pensions. Increase in basic pension.
Italy	Normal pension age for men increased from 60 to 65 and for women from 55 to 60. Early pension age for men with 35 years' coverage increases from 60 to 62.	Adjustment to early-retirement benefits through notional annuity calculation.	Qualification years for long-service pension increased from 37 to 40 years.	Through notional annuity calculation.		From DB to notional accounts. Less generous indexation of higher pensions.
Japan	Pension age increasing from 60 to 65.		Pensionable earnings extended to include bonuses.	Benefits adjusted to reflect expected change in dependency ratio.		Accrual rate reduced.
Korea	Pension age rising from 60 to 65.					
Luxembourg	No significant changes since 1990					
Mexico					Mandatory private DC scheme replaces public, DB plan.	
Netherlands		Planned abolition of early retirement programme.	Shift from final to average lifetime salary in many occupational plans.			
New Zealand	Pension age increased from 60 to 65.				Voluntary DC pensions with auto-enrolment and incentives.	Pre-funding of public pension.
Norway					Mandatory employer DC contributions.	Pre-funding of public pensions.
Poland	Withdrawal of early retirement for certain groups of workers.		From best consecutive 10 in final 20 years to lifetime average.	Through notional annuity calculation in public scheme and annuity calculation in DC.	DC scheme mandatory for new entrants and workers under 30.	Abolition of basic pension. From DB to notional accounts.
Portugal	Pensionable age for women aligned with that for men at 65.	Introduction of increments for late retirement and reductions for early retirement.	From best 10 out of last 15 years to lifetime average earnings	Life-expectancy adjustment to benefits.		Less generous indexation of higher pensions.
Slovak Republic	Increase in pension ages to 62 for men and women.		From best 5 in final 10 years to lifetime average earnings.	Through annuity calculation in DC scheme.	DC scheme mandatory for new entrants and voluntary for existing workers.	From DB to points system.
Spain		Introduction of small increment for late retirement.				

Table II.1.1. **Reforms to national retirement income systems since 1990 in OECD countries** (cont.)

	Pension eligibility age	Adjusted retirement incentives	Change of years in benefit formula or qualifying conditions	Link to life expectancy and/or financial sustainability	Defined contribution scheme	Other
Sweden			Best 15 years to lifetime average (public, earnings-related scheme).	Through calculation of notional annuity and annuity in DC schemes. Additional sustainability adjustment in notional accounts.	DC scheme mandatory for nearly all workers. Occupational plans switch from DB to DC.	From DB to notional accounts. Abolition of income-tax concessions for pensioners.
Switzerland	Pension age for women increased from 62 to 64.					Reduction in required interest rate and annuity rate in mandatory occupational plans.
Turkey	Pension age to increase to 65.					Reduced accrual rate.
United Kingdom	Women's pension age and eligibility for guarantee credit rising from 60 to 65	Increment for deferring pension claim increased. Lump-sum option added.			Employers required to provide access to DC ("stakeholder") pension.	Increase in basic pension. Extension of means-tested supplements. Increased progressivity of earnings-related pension.
United States	Increase in full pension age from 65 to 67.	Changes in adjustment for early/late retirement.				

Source: Whiteford and Whitehouse (2006); national authorities.

Slovak Republic and Sweden have introduced funded DC plans as a substitute for part of their public DB pension schemes. Australia's DC plan was added in 1992 to the existing means-tested public pension. In Mexico, the old public pension was entirely replaced by DC plans, starting in 1997. Italy, Poland and Sweden, on the other hand, introduced notional accounts schemes. All of these countries thus have systems which at least in one or some components adjust to life expectancy.

Germany will adjust benefits in the points system to reflect the financial sustainability of the pension system. If life-expectancy increases, *ceteris paribus*, the number of pensioners per contributor increases and the pension benefit falls. However, the impact of longer life expectancy on benefits might be offset if the number of active workers contributing to the pension system were to increase. Austria is also discussing the introduction of a similar financial-sustainability adjustment.

In Finland and Portugal, the value of pensions will be adjusted to changes in life expectancy at retirement. Another method of adjustment is to increase the standard retirement age and/or the number of contribution years necessary to get a full benefit in line with the evolution of life expectancy. Denmark has introduced a direct link between increasing life expectancy and the pension eligibility age. France, in the 2003 pension reform, linked the required number of years of contributions to get a full pension with life expectancy.

Reducing benefits to reflect longer life expectancy will improve *financial sustainability* but there may be adverse *social effects*. It is well established that there is a link between life expectancy on the one hand and socio-economic status, income and wealth on the other (see Brown and McDaid, 2002 for a survey of 45 studies). This can imply that increases in pension ages or reductions in benefits due to increases in *average* life expectancy may disproportionately hit lower earners. *Retirement incentives* will be improved because people will have to work longer to build up the same benefit.

Introducing defined-contribution plans

As noted above, a series of OECD countries introduced DC plans as a substitute for part of the public, earnings-related pension scheme. Usually, some or all workers had a choice over whether to stay with the public, earnings-related pension or switch to mixed public/private DC provision. (See Mattil and Whitehouse, 2007; and Whitehouse *et al.*, 2007 for further discussion of these reforms.)

The shift to DC pensions is the major reform which shifts the *balance between public and private sectors* in pension provision. The *financial effects* are complex. There is not a direct transfer from contributors to beneficiaries with DC plans as there is with a pay-as-you-go system. However, there is still a transfer of resources between generations from workers to retirees and so the overall financial effect is uncertain. *Retirement incentives* are generally improved. The *social effects* depend on system design, in particular on the interaction with other public retirement benefits.

Changing the indexation of pensions in payment

Indexation refers to the adjustment of pensions *in payment* to changes in prices or earnings. In recent years, many OECD countries have moved away from indexation of pension benefits to earnings towards full or partial indexation to prices. This preserves the purchasing power of pensions, but means that pensioners do not share in the general growth in living standards.[4]

Some countries – Hungary, Poland and the Slovak Republic – adjust pensions using a mixed index composed of wage growth and price inflation. This type of adjustment has been in use in Finland and Switzerland for some time. Swiss pensions are increased with an equally weighted index of wage and price growth while recent reforms in Finland changed the relative weighting in the index. German pension indexation, which was linked to wage growth net of taxes and social security contributions, will in future also be adjusted to reflect the system dependency ratio, the relationship between contributors and beneficiaries.

In Italy, higher pensions are increased by less than price inflation (75 or 90%), while small and medium-level pensions are indexed to prices. Similarly, Austria indexes pensions to prices only up to a ceiling; benefits above that level are increased by a fixed amount and Portugal will in future increase smaller pensions by more than larger ones.

Pension uprating policy is a classic example of *ad-hoc* policy-making. Even if most countries now have a formal link to prices, indexation is still often suspended as an emergency measure to relieve strong financial pressures on the pension system. This happened several times in Germany before the new link was introduced in 2004. Indexation was also temporarily suspended in Belgium and in the United States. In contrast, in the United Kingdom, *ad-hoc* changes were made in order to boost benefits, despite a formal link of public pensions to price inflation.[5]

Less generous indexation of pensions in payment improves the *financial sustainability* of pension systems, but it may pose challenges for long-term *social* and, thus, political sustainability.

Pre-funding public pensions

As an alternative means of introducing pre-funding of pension liabilities as opposed to relying on pay-as-you-go finance, some countries have established public pension reserves. In addition to the long-standing reserves in Japan, Sweden and Switzerland, new reserves have been introduced in Canada, Ireland, New Zealand and Norway (see Palacios, 2002). Because this paper focuses on benefit entitlements, these initiatives are not examined further.

Pension contributions

One of the reasons for the recent wave of pension reforms in OECD countries has been a concern over the effect of high taxes on labour on employment. Table II.1.2 shows the evolution of contribution rates for pensions over the period 1994-2004. Perhaps surprisingly, there is little evidence of an increased pension-contribution burden in this period.

Some 21 OECD countries have a separately identifiable public pension contribution. In half of these, the contribution rate remained basically unchanged over the decade at around 20%. There were relatively large increases in Canada, Italy, Japan and Korea and smaller increases in the Czech Republic and France. There were falls in five countries, including Hungary, Japan and Netherlands.

There are a number of potential explanations for this counter-intuitive finding. First, governments may have responded to rising pension costs by financing them from general revenues rather than earmarked contributions. Secondly, contribution rates may have remained constant while revenues were increased by broadening the contribution base (by

Table II.1.2. **Pension contribution rates (employee plus employer), 1994, 1999 and 2004**

	1994	1999	2004
Australia		Private contributions only	
Austria	22.8	22.8	22.8
Belgium	16.4	16.4	16.4
Canada	5.2	7.0	9.9
Czech Republic	26.9	26.0	28.0
Denmark		Private contributions only	
Finland	18.6	21.5	21.4
France	21.5	24.0	24.0
Germany	19.2	19.7	19.5
Greece	20.0	20.0	20.0
Hungary	30.5	30.0	26.5
Iceland		Private contributions only	
Ireland		No separate pension contribution	
Italy	28.3	32.7	32.7
Japan	16.5	17.4	13.9
Korea	6.0	9.0	9.0
Luxembourg	16.0	16.0	16.0
Mexico		Private contributions only	
Netherlands	33.1	37.7	28.1
New Zealand		No contributions	
Norway		No separate pension contribution	
Poland	–	32.5	32.5
Portugal		No separate pension contribution	
Slovak Republic	28.5	27.5	26.0
Spain	29.3	28.3	28.3
Sweden	19.1	15.1	18.9
Switzerland	9.8	9.8	9.8
Turkey	20.0	20.0	20.0
United Kingdom		No separate pension contribution	
United States	12.4	12.4	12.4
OECD (21)	**19.9**	**20.3**	**20.0**

Note: Rounded to one decimal place.
Source: OECD (1995b, 2001, 2006a).

increasing ceilings, for example). Thirdly, the profile of demographic ageing implies that much of the pressure on pension costs is yet to come. Finally, pension reforms might have succeeded in controlling costs. However, the OECD Social Expenditures database shows that average public spending on old-age and survivors benefits in the OECD countries increased from 6.7% of GDP in 1990 to 7.7% in 2003, see Table II.1.3. There were falls in only seven countries, notably in Finland, Luxembourg and New Zealand. There were very large increases in Italy, Japan, Poland, Portugal and the Slovak Republic of between 3.5% and 7.5% of GDP.

Table II.1.3. **Public spending on old-age and survivors' pensions, 1990-2003**

	1990	1995	2000	2003	Change 1990-2003
Australia	3.7	4.2	4.5	4.1	0.4
Austria	11.9	12.8	12.8	13.2	1.3
Belgium	9.1	9.4	9.1	9.3	0.2
Canada	4.3	4.8	4.4	4.4	0.1
Czech Republic	6.1	6.5	8.0	8.0	1.8
Denmark	7.4	8.4	7.1	7.2	−0.2
Finland	8.1	6.8	5.9	6.4	−1.7
France	10.9	12.2	12.0	12.3	1.4
Germany	10.2	10.9	11.2	11.7	1.5
Greece	11.1	10.8	12.2	12.4	1.3
Hungary	n.a.	n.a.	8.0	8.7	n.a.
Iceland	3.5	3.8	3.6	4.2	0.6
Ireland	4.2	3.7	3.4	3.7	−0.5
Italy	10.2	11.4	13.7	13.9	3.6
Japan	5.0	6.3	8.0	9.3	4.3
Korea	0.8	1.3	1.5	1.4	0.6
Luxembourg	9.6	10.3	7.8	6.5	−3.1
Mexico	0.6	0.8	0.9	1.2	0.7
Netherlands	7.0	6.1	5.6	5.8	−1.2
New Zealand	7.4	5.7	5.0	4.5	−2.9
Norway	7.6	7.5	6.8	7.4	−0.3
Poland	5.3	9.6	10.9	12.4	7.2
Portugal	5.4	7.9	8.7	10.5	5.1
Slovak Republic	n.a.	6.6	6.6	6.5	6.5
Spain	8.1	9.2	8.8	8.4	0.3
Sweden	9.3	10.7	10.0	10.8	1.5
Switzerland	5.8	6.9	6.9	7.2	1.3
Turkey	3.2	3.7	n.a.	n.a.	n.a.
United Kingdom	5.3	6.0	5.9	6.1	0.8
United States	6.1	6.3	6.0	6.3	0.2
OECD	6.7	7.3	7.4	7.7	1.0

n.a.: not available.
Source: OECD Social Expenditures database.

1.2. Impact of pension reforms in selected OECD countries

Reforms to retirement-income regimes, whether they occurred in one "big bang" or a series of smaller changes, often changed a range of the parameters and rules of national systems. This makes it difficult to compare these reform packages between countries based on institutional information alone. The analysis that follows compares the microeconomic indicators of pension systems – such as the replacement rate, the relative pension level and pension wealth presented in Part I – before and after reforms. These microeconomic measures are designed to complement the macro picture provided by long-term financial projections of pension systems. The analysis focuses on 16 OECD countries (Austria, Finland, France, Germany, Hungary, Italy, Japan, Korea, Mexico, New Zealand, Poland, Portugal, Slovak Republic, Sweden, Turkey and the United Kingdom) where there have been substantial pension reforms in the past decade.

Methodology

The results described as "post-reform" are those to be found in the rest of this report. To summarise briefly, these take the situation of a worker entering the labour market

in 2004 and spending the whole of his or her career under the same set of pension parameters and rules: those applying in 2004 along with any legislated changes that will take effect over time.

The pre-reform scenario is built on the following question: what would the parameters and rules of the pension system have been in 2004 had the pension reform not taken place? This stylised approach is designed to isolate the effects of the reform programme from other changes of the past decade. Thus, mortality rates and economic variables are the same in the two scenarios and the same modelling methodology is used (see the section on "Structure of the report and methodology", p. 11).

The aim is *not* to calculate pensions for people retiring in 2004. First, the frequency of pension reforms in some countries would mean that many more than two sets of pension rules would need to be modelled along with often complex transition provisions, making the calculations intractable. Secondly, the position of *current* retirees is better assessed using income-distribution or administrative data on actual benefits of retirees than by microsimulation.

This approach means that two sets of prospective replacement rates are compared: one set that shows the pension entitlements that workers entering the labour market in 2004 were promised if the pre-reform system was still in place. And a second set that shows what entitlements will be under the system that actually existed, *i.e.*, the post-reform system, for workers entering the labour market in 2004. This is a microeconomic comparison and so is silent on the affordability of pension promises in the two scenarios.

Changes in the indexation of pensions in payment are captured in the pension-reform modelling through the calculation of pension wealth. However, changes in policy over indexation of pension-system parameters is more difficult to model realistically. As noted in the section on methodology, some countries, such as Sweden and the United Kingdom, in theory propose to index key parameters, such as the value of retirement safety nets, to *prices*. As previously noted, if implemented over a 40- to 50-year period, this would result in unrealistically low living standards for poorer pensioners which would not be politically sustainable. Therefore, pension-systems parameters are assumed to increase over time in line with *average earnings*. Note that this assumption is applied consistently to both pre- and post-reform scenarios regardless of whether there has been any change in parameter-indexation policy.

Replacement rates for average earners

Pension reforms since the 1990s had a strong impact on replacement rates for workers on average earnings. Table II.1.4 shows *gross* replacement rates before and after the reforms for men and, where they are different, for women. Replacement rates for workers on average earnings are being cut by reforms in all countries except in Hungary where they increase sharply by almost 20 percentage points. The Hungarian result, however, is strongly influenced by the tax system since Hungarian pensions used to be calculated on the basis of earnings net of income taxes. Thus, not all of the increase in replacement rates in Hungary is due to pension reform; tax changes also have a powerful impact. In the United Kingdom, replacement rates are the same before and after reform. The same is true for New Zealand, where the reform merely increased the pension age from 60 to 65. This change does not show up in the replacement rate since the benefit is flat rate. In Poland and for women in Austria, replacement rates are expected to be similar before and after the reforms. The largest reduction is in Mexico where replacement rates were cut by more than

half for men and women. However, it should be noted that the post-reform system applies to workers who entered the labour force after 1997. All existing workers were guaranteed to receive at least the benefit that they would have been entitled to under the pre-reform system. There are also large changes in Italy and Portugal, followed by Sweden, France and Austria. Of course, many of these benefit cuts were necessary since the systems had already encountered financial difficulties which were projected to worsen in the future. The pre-reform systems were often "promising" levels of payment which could never actually have been paid.

Table II.1.4. **Pre- and post-reform gross replacement rates for workers on average earnings in selected OECD countries**[1]

Percentage of individual earnings

	Men		Women (where different)	
	Pre-reform	Post-reform	Pre-reform	Post-reform
Austria	90.0	80.1	80.0	80.1
Finland	66.3	63.4		
France	64.7	51.2		
Germany	48.7	39.9		
Hungary	57.7	76.9	52.7	76.9
Italy	90.0	67.9	80.0	52.8
Japan	40.7	34.4		
Korea	69.3	66.8		
Mexico	72.5	35.8	72.5	29.7
New Zealand	39.7	39.7		
Poland	62.2	61.2	57.3	44.5
Portugal	90.1	54.1		
Slovak Republic	59.5	56.7		
Sweden	78.9	62.1		
Turkey	107.6	72.5	102.8	72.5
United Kingdom	30.8	30.8		

1. OECD countries that have implemented significant pension reforms over the past decade.
Source: OECD pension models.

Adequacy of benefits for low-income workers

Table II.1.5 shows relative pension levels (the pension benefit as a share of economy-wide average earnings) net of taxes and social security contributions for workers earning half average earnings before and after the reforms. This is a more useful measure to assess *benefit adequacy* than the replacement rate, since it shows how far away the lowest-income pensioners are from the average standards of living of workers. It is thus a good indicator of poverty risk for retirees.

The results show that only in two out of the 16 countries did the income position of workers earning half the average improve due to reform. In the United Kingdom, the benefit for the lowest-income group rose from 29% to 36% of average earnings. The increase can be explained by the introduction of the Second State Pension which has differential replacement rates over different bands of earnings. This mechanism increases entitlements for people with low earnings. In addition, the previous minimum income guarantee was increased from 18% of average earnings in 1997 to 21% in 2004; it was subsequently replaced by the pension credit at broadly the same level. In Hungary, the improvement is more marked for female low-income workers. The increase comes

Table II.1.5. **Net relative pension levels pre- and post-reform for low-income workers in selected OECD countries**[1]

	Men		Women (where different)	
	Pre-reform	Post-reform	Pre-reform	Post-reform
Austria	57.8	53.2	53.1	53.2
Finland	44.6	44.8		
France	42.8	42.1		
Germany	39.7	32.6		
Hungary	52.5	58.4	42.9	58.4
Italy	55.9	46.7		
Japan	32.2	26.9	51.1	36.3
Korea	54.3	54.2		
Mexico	38.7	28.2		
New Zealand	41.7	41.7	38.7	28.2
Poland	50.0	38.8	47.1	29.9
Portugal	58.5	45.0		
Slovak Republic	41.8	36.5		
Sweden	44.7	42.8		
Turkey	77.2	52.0	73.2	52.0
United Kingdom	29.4	36.0		

1. OECD countries that have implemented significant pension reforms over the past decade. The net relative pension level is individual pension entitlement (net of any taxes and contributions) divided by average earnings, again net of taxes and contributions.
Source: OECD pension models.

predominantly from the change in pension age, which was increased from 55 years for women to 62 years. Entitlements are thus earned for more years both under the DB and the DC components of the new pension system.

In Finland, France and Korea, the income position of low-income pensioners was protected; pre- and post-reform relative pension levels are almost identical. The same is true for female Austrian low-income pensioners. In the Finnish pension reform of 1996, the basic element of the pension system that was partially pension-income tested was replaced with a more targeted national pension that is fully withdrawn against other pension income; in this way, poor pensioners who have insufficient entitlements from the earnings-related pension scheme are guaranteed a minimum pension level. In France, the result is due to a provision in the 2003 pension reform which stipulates that no full-career worker should have a pension benefit below 85% of the net minimum wage. Although this measure constituted a substantial increase for low-income pensioners, it only just about compensates for the cuts that were made to benefits through the lengthening of the period for the earnings base and the changes made to the occupational schemes in the 1990s.

All other countries saw a decline in benefits as a result of the reforms, even for the poorest group of pensioners. Particularly large reductions of relative pension levels, amounting to 10 or more percentage points, can be observed again in Mexico (from 39% to 28%), in Poland (50% to 39%) and in Portugal (from 58% to 45%). In Germany, the benefit fell from 40% to 33%.

In Mexico, the decline is due to the switch from the old DB system to a DC system. Even though all workers receive a government subsidy to their individual accounts and there is a minimum pension, this is not sufficient to maintain the relative pension level of low-income workers who will retire under the new rules.

In Poland, the reform did not change the level of the minimum pension. But full-career workers on half average earnings are not entitled to this benefit. However, Poland abolished the flat component of its old pension system, which hits low-income workers hardest. Thus, the decline in benefits for workers on half average earnings can be attributed entirely to the systemic reform from the old redistributive system to the new mixed system consisting of notional accounts and funded DC schemes.

In Portugal, the recently agreed pension reform introduces an adjustment of future pensions to increases in life expectancy at age 65. Based on the UN/World Bank database on mortality rates, life expectancy in Portugal at age 65 in the year 2006 is 16.2 years. This is projected to increase to 20.3 years life expectancy in 2050. Thus, benefits are expected to be 81% of their value under current rules as a result of the link to life expectancy for an individual spending a whole career with this adjustment. Due to the minimum pension, however, the benefit falls less for low-income workers than for workers on average earnings.

In Germany, the decline of benefit is due to the change in calculating the pension-point value (as explained above) and the gradual transition to EET taxation which implies an increase in net wages and a reduction of net pension benefits; since there is no explicit minimum pension in the German system, lower-income groups are not protected from the decline. The only safety-net benefit available is social assistance, which, however, is available to older persons under less strict conditions than for the working-age population. In particular, for the elderly no recourse is taken to income or assets of other family members. But for a worker at half average earnings the pension is above the social assistance level.

The effect of changes in the earnings measure

The pension modelling assumes that individual earnings grow in line with the economy-wide average (of 2% real per year). Replacement rates are measured relative to individual earnings, revalued in line with economy-wide average earnings growth to the time of retirement and averaged across the career. With individual earnings tracking the economy-wide average, revalued average earnings are the same as final salary.[6]

A number of countries have changed the way that earnings are measured to calculate pension benefits, typically extending the period over which earnings are measured. In some cases, the effect of these reforms is captured by the pension models under the baseline assumptions. For example, the extension of the averaging period from 10 to 25 years in the French public pension scheme is calculated to cut benefits by 13.2% for a worker whose earnings track the economy-wide average (because of prices valorisation of earlier years' earnings). In Portugal, the new earnings measure will be lifetime average earnings valorised by a mixed index: 25% wage growth and 75% price inflation. On the baseline assumptions, this is expected to cut benefits by 27% compared with the current earnings measure (final 15 years' salary). Of course, changes in earnings measures were part of a broader reform package; these calculations do not relate to the aggregate effect.

In Poland, the Slovak Republic and Sweden, however, changes in the earnings measure are not reflected in the baseline results. These three countries have all extended the averaging period to the full career from much shorter periods. Individuals with earnings that grow faster than those in the economy as a whole will lose from the change in earnings measure. For example, a worker with 1% earnings growth ahead of the average would lose 9.1% as a result of the change in earnings measure in Poland, 17.7% in the Slovak Republic and 13.2% in Sweden.

These calculations should be borne in mind when looking at the overall effect of reforms, since the baseline assumptions understate the impact of changes on workers whose earnings grow faster than the economy-wide average across the career.[7]

Links between earnings and benefits

This section examines how pension reforms have changed the links between earnings and benefits. While the previous section focussed on the relative position of low-income retirees, this part looks more broadly at the degree of redistribution across the entire earnings range.

The analysis uses the index of pension benefit progressivity, which is described in detail in Part I. It is designed in the following way: a basic pension scheme which pays the same benefit to everyone scores 100% and is maximally progressive. A pure insurance scheme that pays benefits which correspond to previous earnings scores zero. It has no progressivity because it pays the same replacement rate to everyone.

The impact of pension reforms is shown in Figure II.1.1, which presents the pre- and post-reform progressivity indices for the 16 countries. Several countries have made their pension systems more progressive; these are shown on Panel A. The strongest increases are found in Mexico, Portugal and in the United Kingdom. In Mexico, this results from the combination of the government subsidy and the minimum pension. In Portugal, the minimum pension compensates part of the benefit cuts for low-income earners leading to a more progressive benefit structure. In the United Kingdom, the higher redistribution results from the new rules that protect pension benefits for low-income earners; these rules were discussed in the previous section. Smaller increases in progressivity occurred in Austria and France. In Germany, there is only a small increase in progressivity due to the fact that the old-age safety nets remained in place, albeit at a low level, while earnings-related pension benefits were cut.

As expected, strong declines in progressivity can be observed in countries that replaced all or parts of their old pension systems with notional or funded DC schemes (Slovak Republic, Poland, Hungary; see Panel B). All four countries have post-reform indices of progressivity fairly close to zero; this shows that they have indeed moved to or are very close to the pure insurance model with a strong link between pensions and earnings. The Swedish pension reform, despite the large notional-accounts component and the mandatory DC element of the new system, has not made the overall system less progressive than the old system; this is due to the replacement of the previous universal basic pension, which was paid to all income groups, with a targeted pension available only to lower-income retirees.

In Italy, the reform abolished the previously existing minimum pension although there remains a social-assistance benefit as a safety net; the link between earnings and benefits was already strong in the old system. This explains why the reform did not change progressivity much despite the introduction of the new notional defined-contribution scheme. The old Hungarian scheme also had a minimum pension but this will not be paid beyond 2009 and was thus not included in the post-reform model. In Poland, the fall in progressivity is due to the removal of the basic pension component.

The largest change took place in the Slovak Republic where practically all redistribution was removed from the pension system. The old Slovak pension system had a ceiling on the value of pension benefits that effectively capped pensionable earnings just

Figure II.1.1. **Index of progressivity of benefit formula before and after reforms**

Gini coefficient of pension entitlements relative to Gini coefficient on earnings
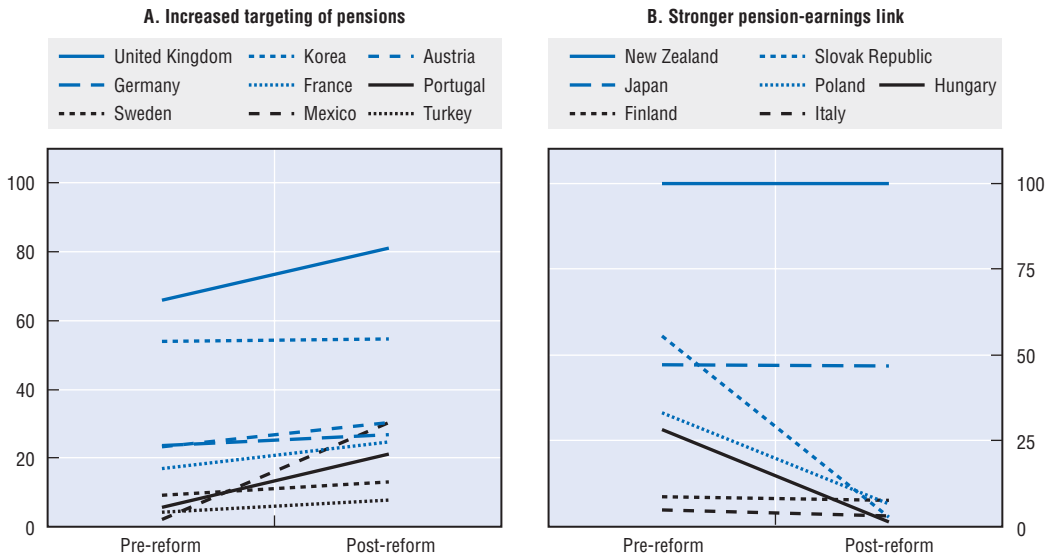
Note: For a detailed definition of the index, see the section on "Progressivity of Pension Benefit Formulae" in Part I.
*Source:* OECD pension models.

StatLink 📈🖼 *http://dx.doi.org/10.1787/450527113232*

above economy-wide average earnings. This meant that higher-income workers received a proportionately smaller benefit than low-income workers. The new two-tiered system follows the insurance model: it has a tight link between earnings and benefits in both components. The earnings-related scheme is based on pension points resulting in a uniform accrual rate for all workers. There is no minimum pension anymore; instead, a minimum income is used for pension benefit calculations. Finally, the DC component obviously has a strict earnings-benefit link. The most relevant change for progressivity is the introduction of a ceiling on pensionable earnings nearly three times as large as the effective ceiling under the old system.

Rebalancing public and private provision

Five OECD countries (Hungary, Sweden, Poland, the Slovak Republic and Mexico) have reset the balance between public and private pension schemes. Figure II.1.2 shows how reforms have affected the composition of the average pension level and average pension wealth (*i.e.* the discounted stream of average future pension payments) from public and private sources.

The most radical change took place in Mexico where all of the pension system was public before the reform and now only a small public component is retained. Three other countries, Hungary, Poland and the Slovak Republic, also started with an entirely public system before the reforms and moved to mixed systems. In Poland and the Slovak Republic, now more than half of the pension promise is delivered through the private sector, while in Hungary the public scheme still accounts for more than 60%.

Sweden stands out in this group of countries, since private employer-based pension schemes have always been important in pension provision. After the pension reform, the

Figure II.1.2. **The changing public private balance**

StatLink ⌐⌐⌐⌐ *http://dx.doi.org/10.1787/565066581031*
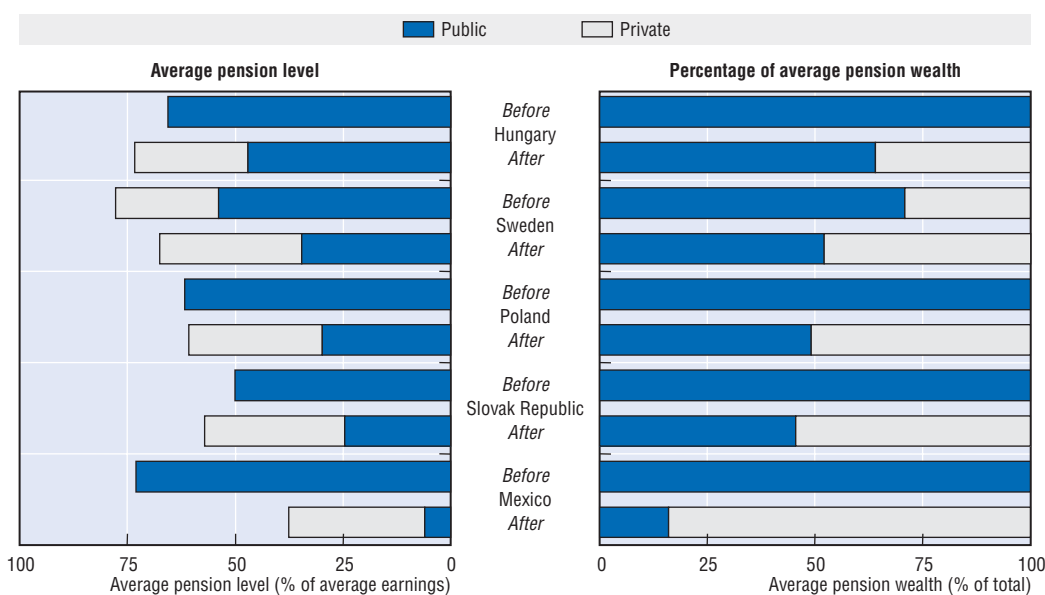
private component increased to just under 50% of the pension promise. This was achieved partly by introducing a new mandatory, privately-managed DC component.

Adjustments to life-expectancy changes

Countries that have introduced DC or notional accounts components into their pension system have an automatic adjustment to life expectancy in these schemes. Others have introduced or proposed links to life expectancy in their traditional DB public schemes. The effects of these adjustments differ depending on their precise design and on the offsetting impact of other parts of the retirement-income regime that are not linked to life expectancy (see Whitehouse, 2007b).

Table II.1.6 summarises how the projected change in mortality between 2002 and 2040 (the years covered in the UN/World Bank population database) would affect pension benefits in a selection of OECD countries that link pensions to life expectancy. On average, life expectancy at age 65 is projected to grow by 3.2 years for the ten countries shown. The projections are based on an assumption of convergence of mortality rates. Life expectancy is predicted to increase by just 2.5 years in Sweden – which had the longest life expectancy in 2002 – and by more than 3.5 years in the three Central and Eastern European countries, which all had life expectancy at age 65 of less than 80 years in 2002.

In all cases, the life-expectancy link will reduce average pension levels. The fall averages around 10% in the nine countries shown. At the same time pension wealth is projected to increase, because not all parts of the pension system are affected. The increase averages almost 7% across countries. Italy, Mexico and Poland have the smallest increase in pension wealth over the period, reflecting the very strong links there between life expectancy and pensions. In Hungary and the Slovak Republic, there remain large public pension schemes that are not linked to life expectancy and so pension wealth increases as mortality improves.

Table II.1.6. **Effects of forecast improvements in life expectancy (2002-2040) on pension benefits in selected OECD countries**[1]

	Total life expectancy at age 65			Average pension level (% of average earnings)			Average pension wealth (multiple of earnings)		
	2002	2040	Change	2002	2040	Change	2002	2040	Change
Australia	82.8	85.6	+15.5%	44.7	42.6	−4.7%	6.5	7.2	+10.8%
Denmark	81.0	84.5	+21.7%	87.1	79.3	−9.0%	11.3	12.4	+9.7%
Finland	81.8	85.4	+21.5%	69.9	61.9	−11.4%	9.0	9.7	+7.4%
Hungary	78.9	82.7	+27.8%	79.6	73.4	−7.8%	10.3	11.9	+15.5%
Italy	82.3	84.9	+15.1%	73.1	65.0	−11.1%	9.4	9.5	+1.1%
Mexico	80.5	82.6	+13.7%	41.0	37.6	−8.3%	4.9	5.0	+2.0%
Poland	79.7	83.4	+25.2%	74.6	60.7	−18.6%	8.2	8.3	+1.2%
Portugal	80.8	84.4	+22.9%	67.9	56.3	−18.9%	8.2	8.3	+1.2%
Slovak Republic	79.4	82.9	+24.2%	63.2	57.1	−9.7%	8.0	8.9	+11.3%
Sweden	83.3	85.8	+13.4%	72.3	67.4	−6.8%	10.4	10.8	+3.8%

Note: Change in life expectancy is given as a percentage of *additional* life expectancy at 65 and not in total life expectancy at 65. Based on unisex mortality rates.
1.   These OECD countries have introduced LE adjustment.
Source: OECD pension models; UN/World Bank population database.

Reducing the long-term pension promise

One of the main objectives of pension reforms in OECD countries has been to cut public pension expenditures and make pension systems financially sustainable in the face of population ageing. Indeed, as Table II.1.1 showed, most common changes to pension systems, such as less generous indexation and/or valorisation, changes in retirement age, changes in the earnings measure, and so on, have had this effect.

To illustrate the extent of financial and fiscal consolidation, the value of the pension promise is compared for pre- and post-reform systems. Again, it is worth noting that, just because a pension system was legislated, does not mean that it would have been paid. Pre-reform systems would often have proved unaffordable in the long term, so this indicator can be thought of as illustrating the extent of change necessary to put pensions on a firm, long-term financial footing.

The comparison is based on the indicator of weighted average pension wealth. This is the most comprehensive measure of the scale of the pension promise made to today's workers because it takes account of differences in life expectancy, pension eligibility ages and indexation of pensions in payment. The calculation is described in detail in the section on weighted average pension levels and pension wealth in Part I of this report.

The impact of reform on the cost of the pension promise is shown in Figure II.1.3 for men (Panels A and B) and women (Panels C and D). It can be seen that by far the largest cost-cutting occurred in Mexico for male workers and, to an even greater extent, for female workers. As discussed earlier, benefits were cut substantially through the move from the old system dominated by the DB scheme to the new system which relies almost entirely on a DC scheme. The decline is larger for women since the benefit in the old system was not adjusted to women's higher life expectancy; pension wealth was higher because women live longer. Under the new scheme, women have the same retirement age as men and annuities are calculated with sex-specific mortality tables which equalise pension wealth from the DC scheme for men and women. The minimum pension component, however, is not sex specific and thus women have a slightly higher pension wealth than men.

Figure II.1.3. **Average pension wealth before and after reforms**

Multiple of economy-wide average earnings

A. Men: larger relative changes

Turkey   Mexico   France

Italy   Korea   Portugal

New Zealand   Germany   Japan

B. Men: smaller relative changes

Austria   Sweden   Hungary

Finland   Slovak Republic

Poland   United Kingdom

C. Women: larger relative changes

Turkey   Italy   Slovak Republic

France   Poland   Portugal

Germany   Mexico

D. Women: smaller relative changes

Austria   Hungary   Finland

Sweden   Korea   New Zealand

Japan   United Kingdom

Note: The charts show the weighted average pension wealth (with the weights reflecting the distribution of earnings). See the section on "Weighted averages: pension levels and pension wealth" in Part I.

Source: OECD pension models.

StatLink 🔗 *http://dx.doi.org/10.1787/837752045346*

In Italy, post-reform pension ages are the same for men and women, but they were different before the reforms. Thus, women experience even greater losses in pension wealth compared to men than they would only on the basis of the difference in life expectancy.

In the new Polish pension system, the retirement age for women is still lower than for men. Women therefore accumulate fewer contributions and retire on a lower benefit. Since life expectancy of women is higher, however, women still have slightly higher pension wealth than men. In the Slovak Republic, pension ages for men and women were increased

to a uniform 62 years, though the reduction in cost from this measure is not very strong since pension levels did not fall by as much as in the other countries. In Japan and Austria, the cuts in the benefit accrual rate also helped lower costs. In Austria, more years of accrual will actually increase the benefit for women, but the higher retirement age and thus shorter retirement period for women will lead to an overall reduction in pension wealth compared to the pre-reform system.

In Finland and Germany, changes in valorisation and post-retirement indexation played an important role. Women's pension wealth is still higher than that of men but the losses experienced as a result of the reforms are broadly the same for both sexes.

Only in the United Kingdom did weighted average pension wealth increase. This was due to changes in replacement rates, particularly for lower-income retirees. The increase was stronger for women than for men due to higher life expectancy of women.

1.3. Conclusions

Nearly all the 30 OECD countries have made at least some changes to their pension systems since 1990. There have been major reforms that will significantly alter future retirement benefits in over half of them. This chapter has outlined eight different types of change to pension schemes that make up recent pension reforms. Some, such as increases in pension ages, are highly visible and controversial. Others, such as changes in the way in which earnings are measured when calculating benefits, are more complex and technical but, nonetheless, can have a huge impact on benefits.

The reform packages, like pensions systems themselves, had diverse and complex features. However, there is a clear underlying trend towards a reduced pension promise for today's workers compared with past generations. The average pension promise in the 16 countries studied fell from 10.7 times annual earnings to 8.4 times for men, a cut of 22%. For women, the reduction is larger: from 13 times annual earnings to 9.7 times, equivalent to a reduction of 25%. Only in two of the 16 countries – Hungary and the United Kingdom – were there increased pension promises on average.

Who reformed pensions and who did not? Six of the ten countries with the *highest* public expenditures on pensions in 1990 – Austria, France, Germany, Italy, Sweden and Finland (ordered from highest to lowest spenders) – have seen major reforms of their pension systems since 1990. However, the rest of the top ten have seen little or no change to their retirement-income regimes over that period. This group consists of Greece, Luxembourg, Belgium and Spain, whose pension expenditures in 1990 averaged 9.5% of GDP, compared with 6.7% for the OECD as a whole.

Substantial pension reforms occurred almost as often in the ten OECD countries that had the *lowest* pension expenditures in 1990 as they did among those already facing a heavy fiscal burden. This group of reformers consists of Japan, Korea, Mexico and Turkey. In Japan, the need for change results from the pace and scale of demographic change: expenditures already increased from 5% of GDP in 1990 to 9.3% in 2003. In Korea, Mexico and Turkey, pension systems are less mature and the demographic situation is currently more favourable than elsewhere in the OECD. Population ageing in Korea is expected to be very rapid. In Mexico and Turkey, the pre-reform systems were very generous, with average pension wealth of around 15 times annual earnings for men and 18 times for women, compared with the OECD averages of 9 and 11 times earnings respectively. Reforms were therefore necessary in these countries even though current pension spending is not especially large.

An assessment of pension reforms in OECD countries cannot and should not be made on fiscal criteria alone. For example, pension reforms also have profound social and distributional implications: how will the changes affect different individuals? The answer is complex. Some countries – such as France, Portugal and the United Kingdom – are moving towards greater targeting of public pensions on low earners. Others – such as Poland and the Slovak Republic – have moved to tighten the link between pension entitlements and earnings when working to improve work incentives and compliance. This has important implications for the future adequacy of retirement incomes for low earners. In Germany, Japan, Mexico, Poland and the Slovak Republic, the net pension entitlement for a full-career worker with half average earnings was around 41% of average earnings before reform, slightly below the average for the OECD as a whole. The reforms will cut this to just 32.5%. There is therefore a risk of a resurgence in old-age poverty in some countries. In contrast, Finland, France, Hungary, Korea, New Zealand and the United Kingdom have protected low-income workers from cuts in benefit in their pension reforms.

Reforming pensions is undoubtedly both a challenging and controversial issue because it involves long-term planning by governments faced with numerous short-term pressures. This chapter has shown that pension reform is not, however, politically impossible. Countries that have yet to embark on necessary changes to retirement-income provision can learn valuable lessons from those that have already made the journey.

Notes

1. Examples of this approach include Economic Policy Committee (European Union, 2005, 2006), Salomaki (2006) and Dang *et al.* (2001).

2. McHale (1999) is one example.

3. This is because the reform required employers to provide private pensions, of which coverage was already widespread before the reform. Therefore, comparing only the mandatory parts of the new system with a pre-reform scenario with only the public pension would be misleading.

4. Note that indexation of pensions in payment is often confused in the public debate with "valorisation", that is the adjustment of earlier years' earnings to reflect price and wage inflation up to the date of retirement.

5. Between 2000 and 2005, the basic pension increased by 7.9% in real terms, keeping its value constant at 15.9% of average earnings on the national measure (Department of Work and Pensions, 2006b, Table 5.1).

6. Individual earnings in any time period i can be expressed as a multiple of earnings in the base period (w0): $w_i = w_0(1 + g)^i$, where w is earnings and g is the growth of (individual and economy-wide) earnings. Revaluing pay in line with earnings growth gives for each period: $w_i = w_0(1 + g)^i(1 + g)^{R - i}$. This is constant over time and so final and lifetime average revalued earnings are equal in this case.

7. Figure 3.4 in OECD (2006b) shows that average earnings of 60-64 year old men are 136% of those of 25-29 year olds, implying annual career earnings growth that averages about 0.8% above the economy-wide average. For women, the ratio of older workers' wages to younger is 112%, implying annual career growth of 0.3%, should this pattern hold in the future.

2. The Role of Private Pensions in Providing Future Retirement Incomes

Cross-country analysis of retirement-income regimes cannot ignore the important and growing role that private pensions play in providing for old age. In 11 OECD countries – Australia, Denmark, Hungary, Iceland, Mexico, Norway, Poland, the Slovak Republic, Sweden, Switzerland and the United Kingdom – the private sector delivers part of the *mandatory* provision for income in old age. Furthermore, in six of these – Australia, Hungary, Mexico, Norway, Poland and the Slovak Republic – the private sector's involvement dates only from the 1990s. As well as the spread of mandatory private pensions, 40% or more of the workforce is covered by *voluntary* private pensions in nine OECD countries.

Section 2.1 of this chapter on private pensions looks at the extent of mandatory private retirement-income provision under both voluntary and mandatory plans. Section 2.2 explores the changing nature of private pension provision. Private pensions have traditionally been employer-provided and been of the defined-benefit (DB) type, where the entitlement depends on some measure of individual earnings and years of service. But in a number of countries, defined-benefit pensions are now disappearing to be replaced by defined-contribution (DC) plans. The pension benefit in DC plans depends on the value of individual and employer contributions, the investment returns that these earn and the terms on which accumulated retirement-income capital can be converted into a flow of pension benefits.

Sections 2.3 and 2.4 focus on the balance between mandatory and voluntary provision for retirement. The analysis measures the scale of the "retirement-savings" gap: the role that voluntary pensions should play when mandatory pensions are relatively low.

The proportion of earnings that need to be contributed to fill the retirement-savings gap is calculated in Section 2.5. Sections 2.6 and 2.7 show how this depends crucially on the years over which people contribute and the rate of return on the funds invested in the pension plan.

Section 2.8 compares replacement rates between countries where retirement savings are almost wholly mandatory and those where voluntary savings are important.

2.1. Coverage of private pensions

Table II.2.1 shows the types of pension scheme offered in different countries. It also shows data on the proportion of people who are covered and the average (or typical) contribution rate. Where countries also have DB plans, the data on contribution rates refer only to DC schemes. Information is shown for the two main type of private pension scheme in each country.

Unfortunately, data on coverage of private pensions can be extremely difficult to obtain and is often difficult to compare because of institutional differences in the markets for long-term savings. Table II.2.1, therefore, draws on a number of sources and the estimates shown should be regarded as preliminary.

Table II.2.1. **Types of private pension scheme, coverage and average contribution rates**

	Largest scheme			Second largest scheme		
	Scheme	Coverage	Contribution	Scheme	Coverage	Contribution
Australia	MO/P	> 90%	9%			
Austria	VO	35%	1.5-2%	VP	10%	–
Belgium	VO	40-50%	1-5%			
Canada	VO	39%	8.5%	VP	50%	–
Czech Republic	VO/P	40%	2.8%			
Denmark	MP	> 90%	1%	QMO	> 80%	10.8-17%
Finland	VP	15%	3%	VO	7%	2%
France	VO	10%		VP	8%	
Germany	VO	57%	2-4%	VP	13%	2-4%
Greece	VO/P	negligible	–			
Hungary	MP[1]	58%	8%	VO/P	31%	5%
Iceland	MO	> 90%	10%			
Ireland	VO/P	52%	c. 10%			
Italy[2]	VO	8%	2.35%	VP	2%	–
Japan[3]	VO	45%				
Korea	VO	negligible				
Luxembourg	VO	20%	–	VP	5%	4%
Mexico	MP	31%	6.275%			
Netherlands	QMO	> 90%	–			
New Zealand	VO	20%	–			
Norway	MO	> 90%	2%	VO	45%	–
Poland	MP[1]	49%	7.3%	VO/P	negligible	–
Portugal	VO	4%	3%	VP	1.5%	–
Slovak Republic	MP[1]	45%	9%	VP	27%	5.4%
Spain	VP	40%	–	VO	10%	–
Sweden	MP	> 90%	2.5%	QMO	> 90%	2%
Switzerland	MO	> 90%	7-18%			
Turkey	VO/P	negligible	–			
United Kingdom[4]	VO	43%	c. 9%	VP	16%	–
United States	VO	47%	c. 9%	VP	17%	

M = mandatory.

O = occupational (employer-based).

P = personal (individual-based).

QM = quasi-mandatory (coverage through collective agreements).

V = voluntary.

Note: The contribution rates shown are for DC plans in countries where there are also DB occupational schemes (Canada, Ireland, Sweden, United Kingdom, United States).

1. Membership is compulsory for new labour-market entrants (and sometimes for younger workers) in these countries but optional for existing workers. Coverage will therefore tend towards 100% over time.

2. The severance pay scheme, known as TFR, can be converted into a retirement-savings plan. Contribution rates are 6.91% for new workers and 2.41% for existing workers. Severance-payment schemes – which may be used to finance retirement – are also important in Japan and Korea.

3. This shows the total covered by tax-qualified pension plans, employees' pension fund or both.

4. The schemes shown are those that are contracted out of the state second pension. Thus, part of the benefits from these schemes is a component of mandatory retirement-income provision.

Source: OECD Private Pension Statistics; European Union, Social Protection Committee (2005); Copeland (2006); Schembari (2004); Palacios and Pallares-Miralles (2000); Government Actuary's Department (2005, 2006); national authorities.

The table shows that 11 OECD countries have mandatory (or quasi-mandatory) private pensions. Eight of these countries have private pensions of the DC type. In the Netherlands, 97% of members of the quasi-mandatory occupational pension schemes are covered by a DB scheme (with the remainder in DC plans). In Iceland and Switzerland, the mandatory occupational plans work in a similar way. Both are based on a mandatory contribution level, a statutory interest rate and a statutory annuity rate. These are therefore closer to DB (and other kinds of earnings-related scheme) than they are to DC plans as normally understood by the term.

Coverage of mandatory and quasi-mandatory pension schemes usually exceeds 90% of employees. However, in Hungary, Poland and the Slovak Republic, only younger workers and/or new labour-market entrants were required to join the new private pension schemes. Some existing workers were able to choose between remaining solely in the public, earnings-related scheme or switching to mixed public/private-DC provision. Hence, coverage of these programmes is between 45 and 60% of the current workforce, but this will rise over time to the whole labour force.[1]

The rest of this chapter focuses on *voluntary* private pension provision: voluntary in the sense that either employers do not have to provide an occupational plan or that individuals do not have to join a personal plan. The relevant coverage rates for voluntary pensions from Table II.2.1 are summarised in Figure II.2.1, which gives a clearer picture of the differences between countries. In four countries – Germany, Ireland, the United Kingdom and the United States – coverage of voluntary, private pensions exceeds half of the workforce. This is mainly through employer-provided schemes, but personal plans also play an important role in all four countries. Covering around 45% of workers, voluntary private pensions are also widespread in Belgium, Japan and Norway. At the other end of the chart, 10% or fewer workers are covered by voluntary, occupational, private pensions in Finland, Italy, Portugal and Spain.

Figure II.2.1. **Coverage of voluntary private pensions**
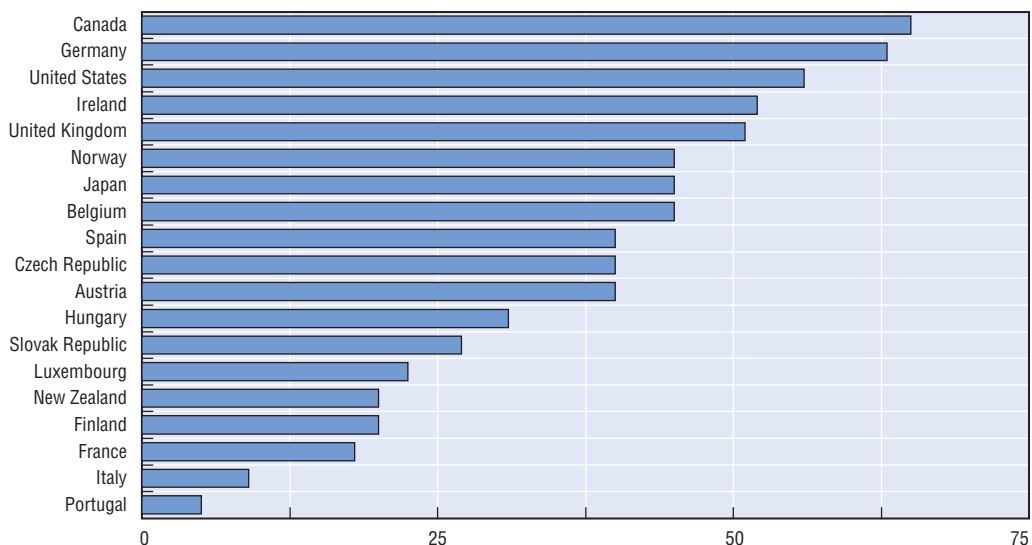
Note: See notes to Table II.2.1.

Source: OECD Private Pension Statistics; European Union, Social Protection Committee (2005); Copeland (2006); Schembari (2004); Palacios and Pallares-Miralles (2000); Government Actuary's Department (2005, 2006); national officials.

StatLink http://dx.doi.org/10.1787/000011070715

As mentioned at the outset, measuring coverage of private pensions is an inexact science. Data on coverage of personal, voluntary, private pensions is especially difficult to obtain and institutional differences are even more significant than they are for voluntary, occupational pensions. For example, Table II.2.1 does not contain data on personal pension coverage in Australia, Belgium, Japan and New Zealand, where some sources suggest that this is widespread.

2.2. Types of voluntary private pension provision

The first edition of *Pensions at a Glance* modelled pension entitlements for members of occupational, defined-benefit pension plans in only three countries: Canada, the United Kingdom and the United States. These countries were chosen for three reasons: first, the breadth of occupational-pension coverage; secondly, the important role that private pensions already play in providing retirement incomes; and, thirdly, availability of data on the rules and parameters of different employers' plans for these countries. However, there has been a shift[2] from DB to DC pensions in these three countries for workers in the private sector and more limited change in Ireland.

Canada

Statistics Canada reports a decline in occupational-pension coverage since the early 1980s. Among men, for example, the proportion of employees covered fell from 55% in the early 1980s to 42% in 2000. The proportion of women covered increased slightly from 37 to 39% over the same period (Morissette and Johnson, 2003). The survey of occupational pension schemes shows rapid growth in coverage of DC pensions – membership up 180% between 1993 and 2003 – albeit from a small base. Overall, DC plans increased their share of members from 9% in 1993 to 15% in 2003. In the private sector, DC schemes accounted for 24% of members in 2003 compared with 14% a decade earlier.

This, however, understates the shift from DB to DC provision. Many employers now offer group personal pensions (known as registered retirement savings plans or RRSPs) instead of traditional occupational plans. Unfortunately, the degree to which this has offset the decline in occupational pension coverage cannot be determined because of lack of suitable data (Schembari, 2004).

Ireland

Between 1999 and 2005, the number of people in occupational pensions increased by nearly 30%, according to the Pensions Board. However, the number in DC plans grew by 63% while DB schemes added only 18% more members. Moreover, most of the growth of DB coverage occurred in the public sector. The number of members of DB schemes (broadly) in the *private* sector (defined formally as those subject to the funding requirement) increased by just 5%. The proportion of members of occupational scheme in the private sector covered by DC arrangements increased from less than 40% in 1999 to 50% in 2005.

United Kingdom

There has been a substantial decline in private-sector, DB occupational plans. These covered 23% of total employees the United Kingdom in 1988-89, nearly halving to 12% in 2002-03. In contrast, the proportion of the workforce in public-sector defined-benefit plans remained broadly constant over most of the period, with a recent increase to 19%

reflecting the expansion of the public sector. This meant that the number covered by private occupational plans fell below those in public plans in 1994-95 (Department of Work and Pensions, 2006a).

According to the Government Actuary's Department (2006), the number of members of private-sector DB plans fell from 4.8 million in 2000 to 3.7 million in 2005. The decline in DB occupational plans in the private sector appears to have accelerated recently: 42% of active members of private-sector, DB plans are in schemes that are closed to new members. In 2003-04 alone, 0.25 million people left these closed plans (either to retirement or to another job) while a net 50 000 were lost from open schemes. This 0.3 million fall is equivalent to a loss of 14% of total members in a single year.

United States

The shift from DB to DC private pensions began earlier in the United States than elsewhere. By 1980, for example, some 32% of active members of an occupational pension scheme were covered by a DC plan. This proportion doubled over the next 15 years to reach 64% by 1995 and grew further to 71% by 2003 (US Department of Labor).

The changing structure of private pension provision

The shift from providing occupational pensions through DB schemes to a DC model has reached different stages in different countries. Many workers are still covered by DB plans, but this is increasingly a legacy from the past. Coverage will diminish rapidly because many schemes are now closed to new members. In countries which retain predominantly DB occupational pension coverage – such as Iceland, the Netherlands and Switzerland – this tends to result from government mandates or provision is quasi-mandatory as a result of industrial-relations agreements.

The framework of *Pensions at a Glance* is forward-looking at it considers workers in the private sector. Very few, if any, individuals entering the labour market today in the countries discussed above will join a DB pension scheme and remain a member of such a plan for their whole working lives. The rest of this chapter, therefore, focuses on DC pension plans.[3]

2.3. Mandatory replacement rates and the pension savings gap

Figure II.2.2 shows again the projected gross replacement rate for the average earner with a full career, which ranges from 31% of individual earnings in the United Kingdom to 96% in Greece (see Part I, "Gross pension replacement rate"). The average gross replacement rate for the 30 OECD countries is almost 59%.

The analysis that follows focuses on the 11 countries at the bottom of the chart that have below-average mandatory replacement rates. What level of voluntary, private pension savings would be needed to deliver an overall gross replacement rate in these countries that equalled the OECD average? This is obviously an arbitrary target but it is illustrative to set a benchmark relative to all OECD countries, including those with mainly mandatory retirement provision.

The difference between the national mandatory replacement rate and the OECD average is here called the "retirement-savings gap". Along with all six of the mainly English-speaking members of the OECD – Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States – mandatory gross replacement rates are below the OECD average in four continental European countries – Belgium, the Czech Republic, France and Germany – and in Japan.[4]

In the United Kingdom, private pension savings would need to deliver a replacement rate of 28% to bring the overall pension up to the level of the OECD average. France has the smallest retirement-savings gap of the 11 countries analysed: 7.5%. For the 11 countries as a whole, the replacement rate from mandatory pensions is 40.6% for average earners, giving a retirement-savings gap of 18.2% on average (relative to the OECD average gross replacement rate for an average earner of 58.7%).

Figure II.2.2. **The retirement-savings gap**

Gross replacement rate for an average earner from mandatory pension schemes and difference from OECD average replacement rate

Source: OECD pension models.

StatLink ⌗⌐ http://dx.doi.org/10.1787/000033132132
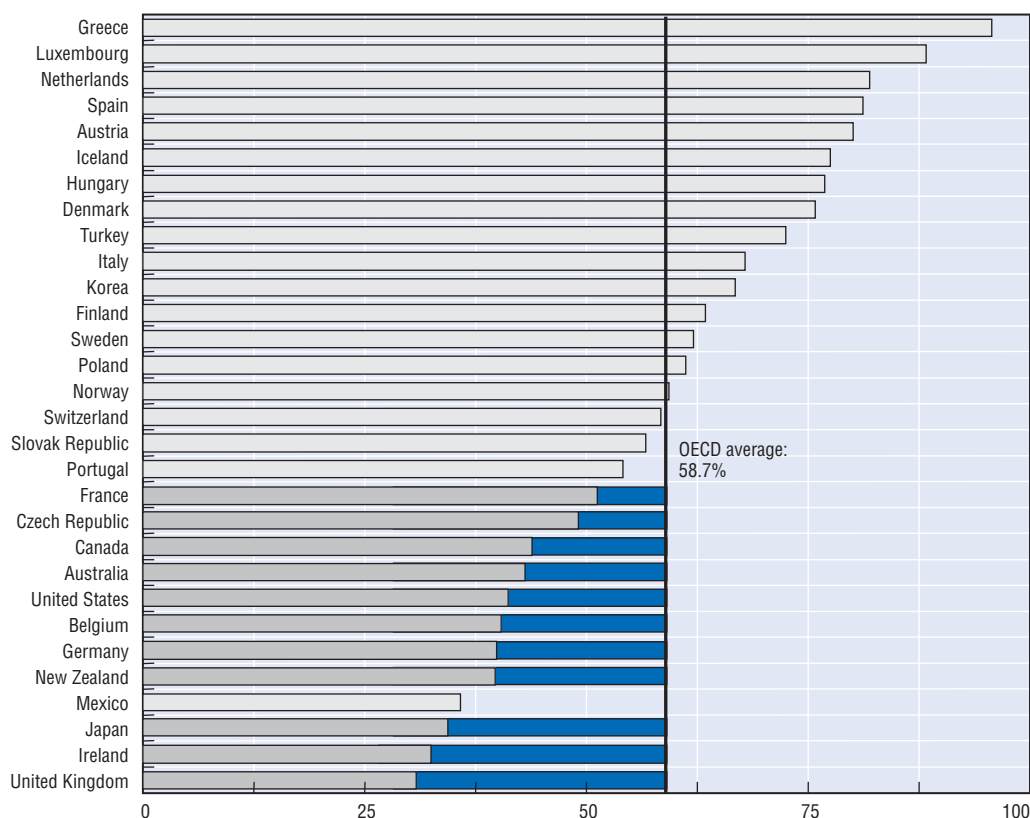
2.4. Mandatory replacement rates and private-pension coverage

Do individuals respond to lower replacement rates from mandatory pensions by making voluntary, private provision for retirement? Figure II.2.3 combines the evidence on coverage of private pensions from Table II.2.1 and Figure II.2.1 with the projections of the replacement rates from mandatory pensions for average earners, which were shown in Figure II.2.2. Two clusters of countries are readily apparent in Figure II.2.3.

First, there is a range of mainly Southern European countries – Greece, Italy, Portugal, Spain and Turkey – but also including Finland[5] and Poland, that have voluntary private pension coverage of less than 10%. These nations also have relatively high mandatory replacement rates for average earners (measured on a prospective basis). For these seven countries, the average gross replacement rate is 71% compared with 59% for the OECD as a whole.

The second cluster consists of eight countries with much lower mandatory replacement rates. Unsurprisingly, half of this group are from the mainly English-speaking countries – Canada, Ireland, the United Kingdom and the United States. However, Belgium, the Czech Republic, Germany and Japan show a similar relationship between private pension coverage and the scale of the mandatory pension system. In these eight countries, the mandatory replacement rate for the average earner is just 38%.

A number of governments – Germany, Ireland, New Zealand and the United Kingdom, for example – explicitly aim to increase the proportion of the workforce with voluntary private pensions. It is worth noting that voluntary private pension coverage does not reach much over 50% of the workforce. Mandating private pensions appears, from the international experience, the only way to have private-pension coverage at a level significantly above one half (Table II.2.1).

Figure II.2.3. **Average projected mandatory pension and coverage of voluntary private pensions**
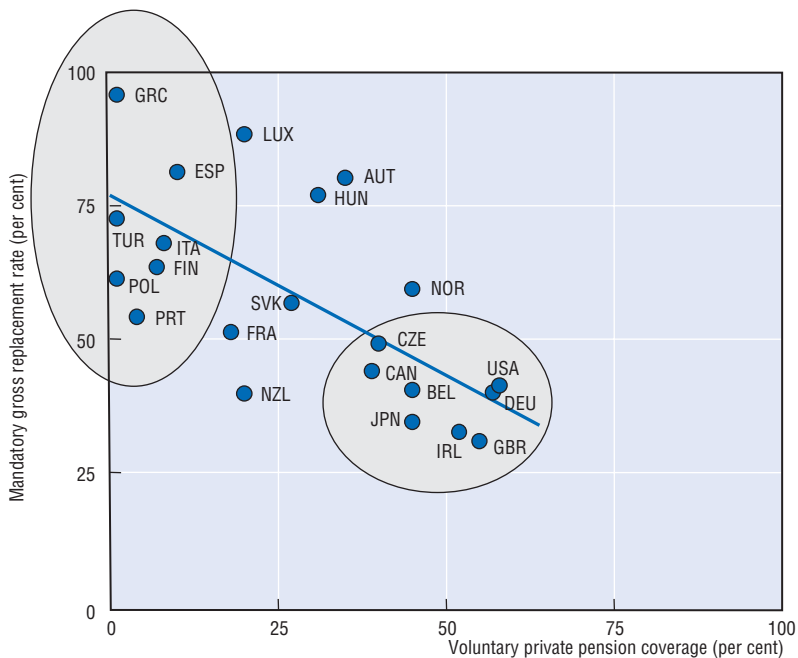
Note: Regression results are coverage = 67.8 (10.6) – 0.692 (–.176) x gross replacement rate (standard errors in parentheses). Both are significant at 1%. The R^2 is 0.434. The two clusters marked are countries with high mandatory replacement rates and low coverage of private pensions and *vice versa* (see text).

Source: Coverage data from Table II.2.1 refer to occupational private pension schemes; gross replacement rates for average earners from OECD pension models.

StatLink 🔗 *http://dx.doi.org/10.1787/000060622602*

2.5. Filling the retirement-savings gap

In the 11 countries under study, the gross replacement rate for the average earner under the mandatory pension system averages 40.6% of earnings. Voluntary, private pension savings would need to provide an additional replacement rate of 18.1% to bring pensions in these countries up to the OECD average relative to individual earnings, as shown in Columns 1 and 2 of Table II.2.2.

The lingering demise of DB occupational pension schemes means that new labour-market entrants in these 11 countries will have access mainly or only to DC plans to close the retirement-savings gap. Table II.2.2 shows the steps required to calculate the contribution rate – the proportion of earnings paid into the defined-contribution account – that would deliver the replacement rate required to equal the OECD average pension.

The 11 countries under study differ in the normal pension age, as shown in Column 3 of Table II.2.2. The normal pension age is age 65 in eight of the countries, but is 60 in France, 62 in Hungary and will reach 67 in the United States. The normal pension age affects the duration over which contributions are made. On the baseline assumption of labour-market entry at age 20, individuals will contribute for between 40 and 47 years, although in most cases this will be for a 45-year period, as shown in Column 4 of Table II.2.2. Column 5 shows the accumulated pension capital at the time of retirement for each unit of contributions and how this varies with the contribution period. With 45 years' contributions, the accumulated capital at retirement would be 64.3 times the annual contribution. The difference between the 45 units contributed and the 64.3 units of accumulated pension capital is because of the compound-interest effect. (The results in Table II.2.2 use the baseline assumptions of this report: 2% annual growth in real earnings and a 3.5% annual real return on investments.)

Normal pension ages – along with national life expectancy – also affect the duration over which the pension is likely to be paid. This is the role played by the "annuity factor" in these calculations. The annuity factor – Column 6 – gives the present value of a flow of pension payments, taking account of differences in pension age and life expectancy.

The final column of Table II.2.2 shows the percentage of earnings that an average earner would need to pay into a private pension plan to plug the retirement-savings gap. The results are also shown graphically in Figure II.2.4. The United Kingdom has the largest replacement-rate gap and the highest required contribution rate. Japan's replacement-rate gap is 4 percentage points lower than in the United Kingdom but life expectancy is longer, as evidenced by the higher annuity factor in Table II.2.2. The required contribution rate in Japan is 6.7% compared with 6.9% in the United Kingdom. France has the smallest replacement-rate gap, but normal retirement age of 60 and life expectancy above the OECD average together imply that the annuity factor is the highest in Table II.2.2. This, in turn, increases the required contribution rate compared with countries with normal retirement at 65 or more. The required contribution rate is 2.6% in France and the Czech Republic.

Table II.2.2. **Filling the retirement-savings gap**

Calculating the required contribution rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mandatory GRR (%)	GRR gap (%)	Pension age	Years	Accumulation	Annuity factor	Contribution rate (%)
Australia	43.1	15.6	65	45	64.3	16.5	4.0
Belgium	40.4	18.3	65	45	64.3	16.4	4.7
Canada	43.9	14.8	65	45	64.3	16.4	3.8
Czech Republic	49.1	9.6	63	43	60.4	16.6	2.6
France	51.2	7.5	60	40	54.8	19.3	2.6
Germany	39.9	18.8	65	45	64.3	16.0	4.7
Ireland	32.5	26.2	65	45	64.3	15.7	6.4
Japan	34.4	24.3	65	45	64.3	17.6	6.7
New Zealand	39.7	19.0	65	45	64.3	16.2	4.8
United Kingdom	30.8	27.9	65	45	64.3	16.0	6.9
United States	41.2	17.5	67	47	68.3	15.3	3.9

Note: GRR = gross replacement rate. The calculations assume a real rate of return on investment of 3.5% per year. A full career of contributions is defined as from age 20 to the normal pension eligibility age. Actuarial calculations use World Bank/United Nations mortality projections for 2040.

Source:

Replacement rates – Columns 1 and 2 – are taken from the OECD pension models. For information on normal pension eligibility ages, see the country chapters in this report.

Years of contributions – Column 4 – are simply the difference between normal pension eligibility age and age 20, the baseline assumption for labour-market entry.

The calculation of accumulated pension capital – Column 5 – is based on $K = e^{rT} \frac{e^{(g-r)T} - 1}{g - r}$, where K is pension capital, g is real earnings growth and r is the real rate of return on investments and T is the duration of contributions. The derivation of this formula is explained in Box 1 of Queisser and Whitehouse (2006).

The calculation of the annuity factor – Column 6 – is based on the survival function, s_i, which is defined as $\prod_{i=R}^{100}(1 - \lambda_i)$, where Π is the product operator and λ is the mortality rate by age, indexed i, and R is the retirement age. The annuity factor, A is then $\sum_{i=R}^{100} s_i (1 + z)^{-i}$. See Box 2 of Queisser and Whitehouse (2006).

Source: The required contribution rate – Column 7 – is the replacement rate gap – Column 2 – divided by the capital accumulation – Column 5 – multiplied by the annuity factor – Column 6.

Figure II.2.4. **Filling the retirement-savings gap**

Contribution rate with a full history required for average earner to reach OECD average gross replacement rate
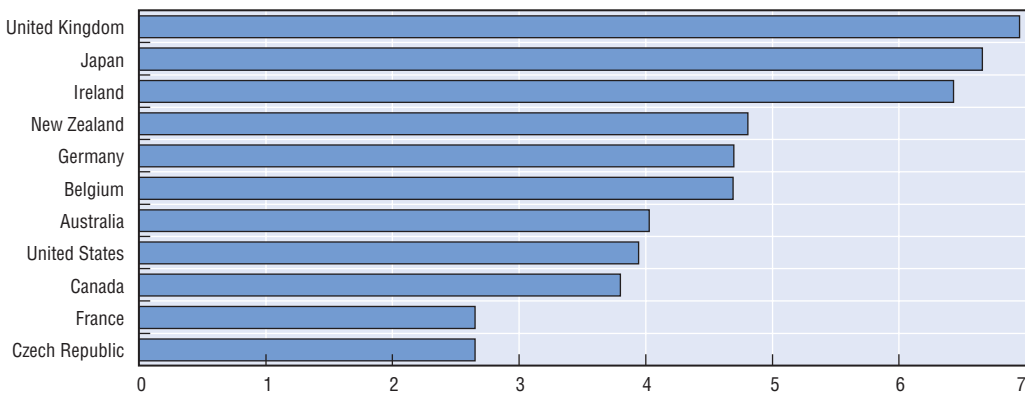
Source: OECD pension models; see Table II.2.2.

StatLink 🔗 *http://dx.doi.org/10.1787/000061850525*

2.6. Contribution density and the retirement-savings gap

The baseline assumption when *Pensions at a Glance* compares *mandatory* pension systems is that of a *full-career worker*, defined as a worker who enters the labour market at age 20 and contributes every year until the normal pension age in the respective country. The reasoning behind this assumption is set out above in the methodology section. However, people can usually choose whether or not to be covered by *voluntary* schemes and how much to contribute. In contrast, *mandatory* pension systems cover workers whether they like it or not. Secondly, they do not offer a choice of how much to contribute. Thirdly, through systems of credits for childcare and unemployment, they also often cover people when they are not working. A full career of contributions is therefore less realistic as a baseline for voluntary, private pensions than it is for mandatory schemes.

Figure II.2.5 shows how the number of years over which people contribute affects the contribution rate required to fill the retirement-savings gap, that is, to deliver an overall – mandatory plus voluntary – replacement rate that equals the OECD average mandatory replacement rate. At the left-hand side of the chart is the required contribution rate with a full contribution history – from age 20 to national normal pension age – which reprises the results in Table II.2.2 and Figure II.2.4 above.

The next entry on the chart shows the situation with five years missing from the contribution history, *i.e.*, assuming people delay starting their private pension until age 25.[6] With ten missing years – at the centre of the chart – the required contribution rate in the United Kingdom increases to nearly 10%, compared with 7% with a full career. With 20 missing years, contributions need to be nearly 15% to plug the retirement-savings gap. In Ireland and Japan, the necessary contribution rates are a little below the rates for the United Kingdom.

In Belgium, Germany and New Zealand, the required contribution rate is around 4.6% for a full career, 6.7% with ten missing years and 10% with 20 missing years.

Figure II.2.5. **Contribution density and the retirement-savings gap**

Contribution rate needed to reach OECD average gross replacement rate by number of years of contributions
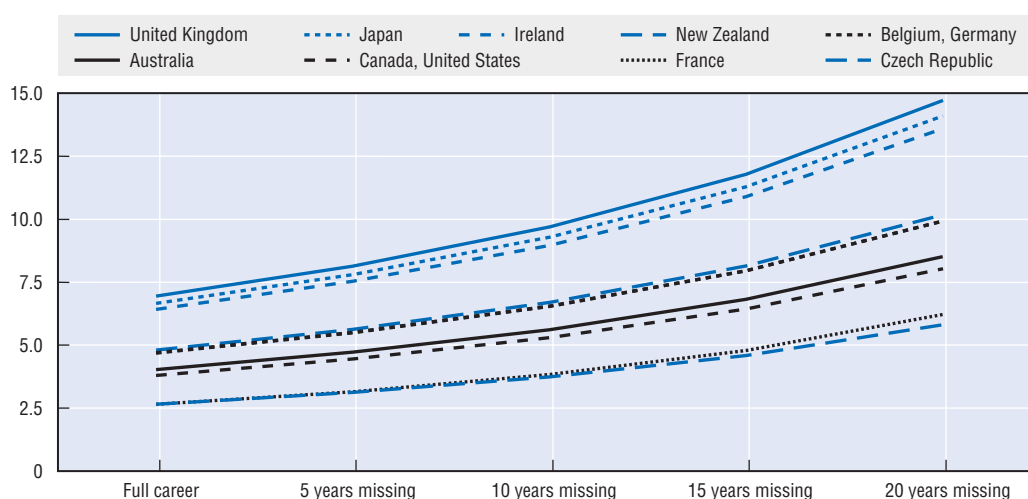
Note: Missing years are assumed to occur at the beginning of the career.
Source: OECD pension models. For details, see notes to Table II.2.2.

StatLink 🔗📊 *http://dx.doi.org/10.1787/000072758576*

2.7. Real rates of return on investments and the retirement-savings gap

The value of DC pensions during retirement depends crucially on the rate of return on investments as well as on the amount contributed. Figure II.2.6 shows how varying the real rate of return affects the contribution rate required to fill the retirement-savings gap relative to the baseline assumption of this report, which is a 3.5% real return.

What matters for the replacement rate with a DC pension is the *differential* between the real return on investments and real wage growth. The analysis underlying Figure II.2.6 holds the assumed rate of wage growth constant at 2%. It then looks at a situation with lower investment returns of 2%, that is, equal to real wage growth. It also considers a higher investment return of 5%. These low- and high-return scenarios are symmetric around the baseline.

Ireland, Japan and the United Kingdom have the largest retirement-savings gaps, averaging 6.7% on the baseline assumptions. However, a lower rate of return would naturally mean that individuals would need to contribute more. To fill the retirement savings gap in these three countries would need a 9.5% contribution rate if real returns were only 2%. In contrast, higher returns would offset some of the requirement to contribute to the private pension plan, lowering the necessary contribution rate to only 4.5%.

At the other end of the scale, the contribution rates required in the Czech Republic and France would be 3.7% with low returns, 2.6% at the baseline and 1.8% with high returns.

Figure II.2.6. **Rate of return on investments and the retirement-savings gap**

Contribution rate needed to reach OECD average gross replacement rate by rate of return on investments

Source: OECD pension models. For details, see notes to Table II.2.2.

StatLink 🔗 *http://dx.doi.org/10.1787/000081617754*
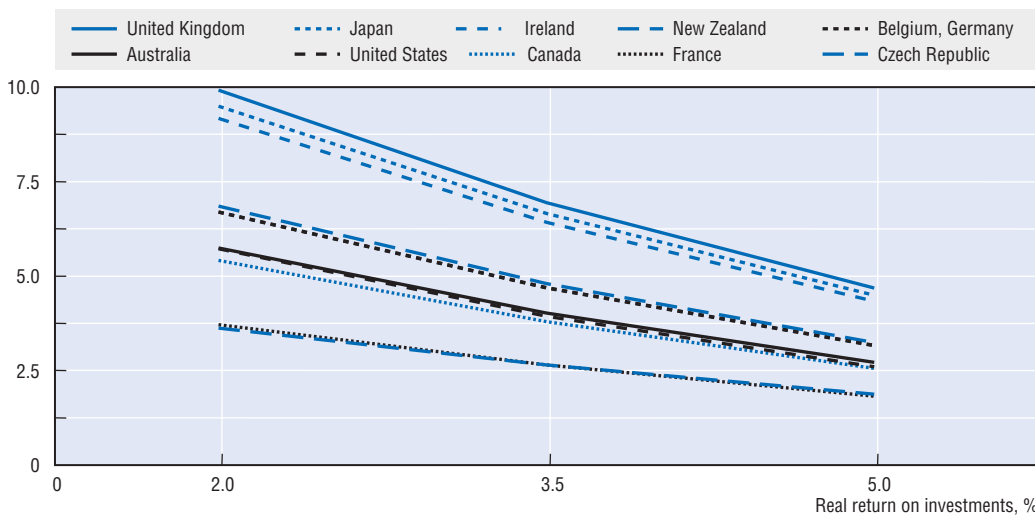
2.8. Indicative gross replacement rates including voluntary pensions

With assumptions of how long people contribute to voluntary private pensions and how much they contribute, the OECD pension models can calculate the overall replacement rate from both mandatory and voluntary pensions. Of the 11 countries that have been the focus of this chapter, there are data available on coverage of voluntary pensions for all bar Australia (Table II.2.1). Coverage in France and New Zealand is 20% or less and so these plans are less likely to play an important role in providing retirement

incomes in the future. In Japan, DB, lump-sum and hybrid pension schemes remain the norm; DC plans have made few inroads.

Data on average contribution rates are even more difficult to obtain than information on coverage. The preliminary evidence presented in Table II.2.1 showed, for example, mean contribution rates for those covered of 8.5% in Canada, around 9% in the United Kingdom and United States and 10% in Ireland. The average contribution in the Czech Republic is reported as 2.8%. Reliable data are even harder to obtain for Belgium and Germany. A 4% contribution rate is assumed for Germany, since this is the maximum that attracts sizeable public subsidy. The results below assume a contribution rate of 4.25% for Belgium, which is at the upper end of the 1-5% range that is thought to be typical (Table II.2.1). The contribution rates assumed in the analysis of voluntary private pensions are summarised in the final column of Table II.2.3.

The first column of Table II.2.3 reprises the mandatory gross replacement rates for average earners in the seven countries studied. These replacement rates vary from 31% in the United Kingdom to 49% in the Czech Republic, compared with the 59% average for the OECD as a whole.

The following columns of Table II.2.3 show *total* replacement rates, including voluntary private pensions. These are shown for a full career of contributions (from 20 to the national normal pension age) and for contribution histories missing 10 and 20 years. The highest assumed contribution rate is in Ireland: 10% of earnings. Contributing for a full career would increase the gross replacement rate from 32.5% to 73.3%, well above the OECD average. Even with ten missing years – *i.e.*, contributions from age 30 to 65 – the total, mandatory plus voluntary replacement rate would be 61.7%. Only with 20 missing years does the total replacement rate fall below the OECD average.

Table II.2.3. **Indicative replacement rates for average earners**

Mandatory pensions plus voluntary private pension schemes

	Replacement rate for average earner (percentage)				Assumed contribution rate
	Mandatory only	Voluntary			
		Missing 20	Missing 10	Full career	
Belgium	40.4	48.3	52.3	57.1	4.25%
Canada	43.9	55.0	63.2	72.6	8.5%
Czech Republic	49.1	53.7	56.3	59.3	2.8%
Germany	39.9	47.5	51.4	56.0	4%
Ireland	32.5	51.8	61.7	73.3	10%
United Kingdom	30.8	47.9	56.8	67.0	9%
United States	41.2	60.7	70.2	81.2	9%

Note: The results for the United Kingdom assume that the individual is contracted in to the public pension scheme (formerly Serps – the state earnings-related pension schemes –, now S2P – state second pension). If individuals were contracted out, the overall replacement rate would be lower because S2P benefits would be foregone in return for the rebate of social security contributions paid for contracting out.
Source: OECD pension models.

Figure II.2.7 shows how indicative replacement rates with voluntary pension schemes compare with the mandatory replacement rates in the rest of the OECD countries. The black line in this chart simply repeats the data from Figure II.2.2 in this chapter. With a full career of voluntary contributions, shown by the light-grey bars, total replacement rates compare favourably with those in countries with larger mandatory pension provision. Even

with ten years' contributions missing, overall replacement rates are only significantly below the OECD average in Belgium and Germany, where the assumed contribution rate is smaller than in the other five countries studied. In Germany, however, voluntary pensions fill the gap between pre- and post-reform replacement rates.

Figure II.2.7. **Indicative replacement rates for average earners: mandatory and voluntary schemes**

Source: OECD pension models.

StatLink ᔔᕊ *http://dx.doi.org/10.1787/000101177147*
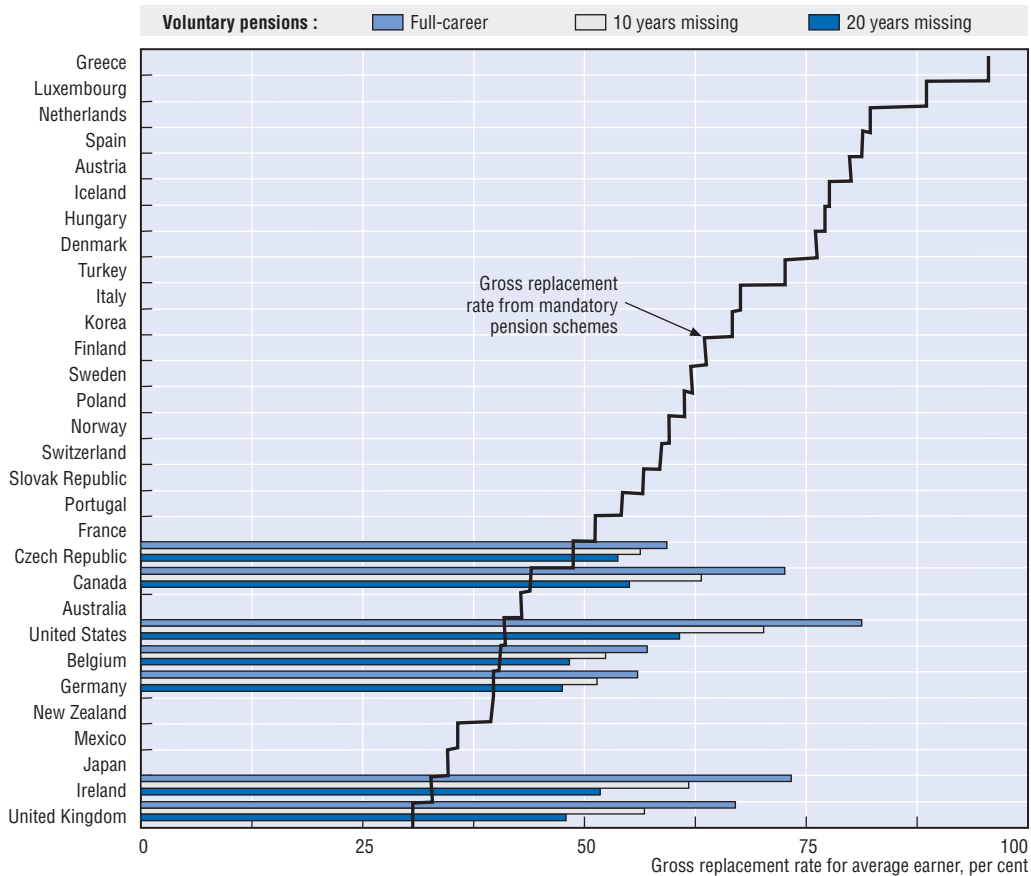
2.9. Conclusions and future developments

The target replacement rate from the mandatory (usually public) pension system is relatively low, leaving a large "space" for voluntary, private pension provision in around a dozen OECD countries. In most of these countries, coverage of private pensions is broad. Around one half of employees contribute to private pensions (on the best available evidence). However, this leaves a substantial potential gap in private-pension coverage. In many cases, this may simply result from the fact that the need for retirement savings is concentrated among either high- or high- and middle-earners. If low earners can expect an adequate retirement income from safety-net provisions, there might be no need for them to save for old age. But this is by no means certain.

A second concern arises because the coverage data are a "snapshot" whereas lifetime coverage and contributions determine individual's retirement incomes. It is not possible,

for example, to know whether snapshot coverage of 50% implies that half the workforce contributes for every year of their working lives or the whole workforce contributes for half of their working lives. The implications for pension policy are very different if the target is to get more people to contribute or to get the same people to contribute for more of their careers.

The "traditional" way of encouraging voluntary savings for retirement has been through tax incentives. However, these can be expensive and there is strong evidence that they are inefficient, in that much of the saving would have happened anyway without the incentive; tax incentives tend to be worth more to higher earners, for example.

New approaches to encouraging private pension saving rely on the insights of behavioural economics about people's natural inertia. Such "soft compulsion", requiring people to save unless they opt out, will be introduced at a national level, first, with the KiwiSaver plan in New Zealand. The United Kingdom aims to introduce a similar scheme and Ireland is debating the merits of going down this route in an attempt to raise private-pension coverage to 70%.

The OECD will continue to monitor these innovations in pension policy in future editions of *Pensions at a Glance* and assess their implications for pension policy throughout its member countries.

Notes

1. See Mattil and Whitehouse (2007) and Whitehouse *et al.* (2007) on these reforms.

2. Gustman and Steinmeier (1992) and Disney and Whitehouse (1992) call the change in the United States and United Kingdom, respectively, a "stampede".

3. However, the Annex to this chapter presents some data on DB plans.

4. In Mexico, a large informal sector means that many workers are not covered by the mandatory pension system. Moreover, the new pension scheme, based around mandatory individual accounts, guaranteed all workers in the labour market at the time of reform that their pensions would not fall below those promised by the old pension system. Thus, the issue of the retirement-savings gap in Mexico has a very different character from that in other OECD countries.

5. There are nine earnings-related pension programmes for different occupations in Finland, four of which cover private sector employees. All schemes have harmonised rules, are co-ordinated by the Central Pension Security Institute and are counted as part of general government.

6. Compounding of interest over time means that missing contributions earlier in the career matters more for the replacement rate than in later years (provided that the investment return exceeds wage growth, which is the baseline assumption of this report).

ANNEX

Gross Replacement Rates Including Defined-Benefit Occupational Plans

Section 2.2 of this chapter showed how DB occupational schemes, particularly for workers in the private sector, are being replaced by DC plans. This change affects workers in more than half of countries with significant coverage of voluntary, employer-provided pensions.

The first edition of *Pensions at a Glance* showed calculations for replacement rates including DB occupational plans for three countries: Canada, the United Kingdom and the United States. This Annex provides updated information for these three countries along with information for Ireland.

Table II.A2.1 briefly summarises the main parameters of the DB schemes that have been modelled. In most cases, national surveys of pension plan parameters and rules have formed the basis for choosing these particular values although there is, of course, considerable variation between different schemes.

Table II.A2.1. **Parameters and rules of illustrative defined-benefit occupational plans**

	Canada	Ireland	United Kingdom	United States
Earnings measure	Final salary	Final salary	Final salary	Final salary
Accrual rate	2%	1.67%	1.25%	1.5%
Integration	Lower accrual	Basic pension	Contracted out	—
Preservation	None	Price inflation	Price inflation	None
Indexation	Half price inflation	Price inflation	Price inflation	None

Note: Integration in Canada means that the accrual rate is 1.3% on earnings to the ceiling of the public pension and 2% above. In Ireland, only earnings above the basic pension are assumed to accrue DB pensions. The occupational plan in the United Kingdom is assumed to be contracted out of the state earnings-related pension scheme/state second pension (Serps/S2P), implying that the individual foregoes these benefits. The parameters shown for the United Kingdom are the minimum benefits that allow contracting out. The row entitled "Preservation" shows the rules for adjusting benefits for early leavers who change job before retiring.
Source: OECD Secretariat based on OECD (1995a), National Association of Pension Funds (2005), Government Actuary's Department (2006), Mitchell and Dykes (2000).

Table II.A2.2 provides indicative replacement rates split by component of the pension system. In all cases, the worker is assumed to spend a full career covered by an occupational pension plan. However, it is assumed that the career is divided into four equally long jobs. Changing employer reduces the value of the pension because of incomplete preservation of final-salary-based rights between the time of changing job and retiring.

In Canada, a worker on average earnings with an occupational plan would, under these assumptions, have an extra 26% replacement rate on top of the public pension scheme. However, part of this would be offset by reduced entitlement to the targeted scheme, the guaranteed income supplement.

The results for the United Kingdom are complicated by the rules for contracting out of the state pension. The individual will lose a 15.6% replacement rate from the state second pension while gaining 37.4% from the occupational plan. The occupational plan in Ireland delivers a much lower replacement rate than in the United Kingdom because of the integration of the benefit with the public scheme, meaning that only earnings above the basic pension are covered.

Table II.A2.2. **Indicative replacement rates for average earners**

Mandatory pensions plus voluntary defined-benefit occupational schemes

	Targeted	Basic	Public	Occupational	Total
Canada	4.6	14.4	25.0		**43.9**
	0.0	14.4	25.0	26.4	**65.8**
Ireland		32.5			**32.5**
		32.5		17.4	**49.9**
United Kingdom		15.2	15.6		**30.8**
		15.2		37.4	**52.6**
United States			41.2		**41.2**
			41.2	30.6	**71.8**

Note: Assumes that the occupational pension in the United Kingdom is contracted out of the state pension scheme.
Source: OECD pension models. See also OECD (2005), Part II, "Voluntary, Occupational Pensions".

References

Brown, R.L. and J. McDaid (2002), "Factors Affecting Retirement Mortality", *North American Actuarial Journal*, Vol. 7, No. 2, pp. 24-43.

Copeland, C. (2006), "Retirement Plan Participation and Retirees' Perception of their Standard of Living", Issue Brief No. 289, Employee Benefits Research Institute, Washington DC.

Dang, T.T., P. Antolín and H. Oxley (2001), "Fiscal Implications of Ageing: Projections of Age-Related Spending", Working Paper No. 305, Economics Department, OECD, Paris.

Department of Labor, Employee Benefits Security Administration (various years), *Private Pension Plan Bulletin: Abstract of Form 5500 Annual Reports*, Washington, DC.

Department of Work and Pensions (2006a), *Second Tier Pension Provision 1978/79 to 2003/04*, London.

Department of Work and Pensions (2006b), *The Abstract of Statistics for Benefits, National Insurance Contributions and Indices of Prices and Earnings: 2005 edition*, London.

Disney, R.F. and E.R. Whitehouse (1992), *The Personal Pension Stampede*, Report No. 42, Institute for Fiscal Studies, London.

European Union, Economic Policy Committee (2005), "The 2005 Projections of Age-Related Expenditure (2004-2050) for the EU-25 Member States: Underlying Assumptions and Projection Methodologies", *European Economy*, Special Report No. 4/2005.

European Union, Economic Policy Committee (2006), "The Impact of Ageing on Public Expenditure: Projections for the EU-25 Member States on Pensions, Health Care, Long-term Care, Education and Unemployment Transfers (2004-2050)", *European Economy*, Special Reports No. 1/2006.

European Union, Social Protection Committee (2005), *Privately Managed Pension Provision*, Brussels.

Fujisawa, R. and E.R. Whitehouse (2007), "The Role of the Tax System in Old-Age Support: Cross-Country Evidence", Social, Employment and Migration Working Paper, OECD, Paris, forthcoming.

Government Actuary's Department (2005), *Occupational Pension Schemes 2004: Twelfth Survey by the Government Actuary*, London.

Government Actuary's Department (2006), *Occupational Pension Schemes 2005: Thirteenth Survey by the Government Actuary*, London.

Gustman, A. and T. Steinmeier (1992), "The Stampede towards Defined Contribution Plans: Fact or Fiction?", *Industrial Relations*, Vol. 31, pp. 361-369.

Mattil, B. and E.R. Whitehouse (2007), "Individual Incentives to Switch between Public and Private Pension Schemes", Social, Employment and Migration Working Paper, OECD, Paris, forthcoming.

McHale, J. (1999), "The Risk of Social Security Benefit Rule Changes: Some International Evidence", Working Paper No. 7031, National Bureau of Economic Research, Cambridge, Mass.

Mitchell, O.S. and E.L. Dykes (2000), "New Trends in Pension Benefit and Retirement Provisions", Working Paper No. 2000-01, Pension Research Council, Wharton School, University of Pennsylvania, Philadelphia.

Morissette, R. and A. Johnson (2003), "Are Good Jobs Disappearing in Canada?", Research Paper No. 239, Analytical Studies Branch, Statistics Canada, Ottawa.

National Association of Pension Funds (2005), *Annual Survey*, London.

OECD (1995a), *Private Pensions in OECD Countries: Canada*, Paris.

OECD (1995b), *The Tax/Benefit Position of Production Workers: 1991-1994*, Paris.

OECD (2001), *Taxing Wages: Income Tax, Social Security Contributions and Cash Family Benefits* 1999-2000, Paris.

OECD (2004), *OECD Classification and Glossary of Private Pensions*, Paris.

OECD (2005), *Pensions at a Glance: Public Policies across OECD Countries*, Paris.

OECD (2006a)*, Taxing Wages*, Paris.

OECD (2006b), *Live Longer, Work Longer*, Paris.

OECD (2007), *Benefits and Work Incentives,* Paris.

Palacios, R.J. (2002), "Managing Public Pension Reserves Part II: Lessons from Five Recent OECD Initiatives", Pension Reform Primer series, Social Protection Discussion Paper No. 0219, World Bank, Washington, DC.

Palacios, R.J. and M. Pallares-Miralles (2000), "International Patterns of Pension Provision", Pension Reform Primer series, Social Protection Discussion Paper No. 0009, World Bank, Washington, DC.

Pensions Board (various years), *Annual Report*, Dublin.

Queisser, M. and E.R. Whitehouse (2006), "Neutral or Fair? Actuarial Concepts and Pension-System Design", Social, Employment and Migration Working Paper No. 40, OECD, Paris.

Salomaki, A. (2006), "Public Pension Expenditure in the EPC and the European Commission Projections: An Analysis of the Projection Results", European Economy Economic Papers No. 268, European Commission, Brussels.

Schembari, P. (2004), "Pension Plans in Canada", Pension and Wealth Research Paper No. 1, Statistics Canada, Ottawa.

Whiteford, P. and E.R. Whitehouse (2006), "Pension Challenges and Pension Reforms in OECD Countries", *Oxford Review of Economic Policy*, Vol. 22, No. 1, pp. 78-94.

Whitehouse, E.R. (2000), "Administrative Charges for Funded Pensions: Measurement Concepts, International Comparison and Assessment", *Journal of Applied Social Science Studies*, Vol. 120, No. 3, pp. 311-361.

Whitehouse, E.R. (2001), "Administrative Charges for Funded Pensions: Comparison and Assessment of 13 Countries", *Private Pension Systems: Administrative Costs and Reforms, Private Pensions Series*, Vol. 3, OECD, Paris.

Whitehouse, E.R. (2006), *Pensions Panorama: Retirement-Income Systems in 53 Countries*, World Bank, Washington, DC.

Whitehouse, E.R. (2007a), "Pension Incentives to Retire", Social, Employment and Migration Working Paper, OECD, Paris, forthcoming.

Whitehouse, E.R. (2007b), "Life-Expectancy Risk and Pensions: Who Bears the Burden?", Social, Employment and Migration Working Paper, OECD, Paris, forthcoming.

Whitehouse, E.R., B. Mattil and R.J. Palacios (2007), "Rebalancing Retirement-Income Systems: The Role of Individual Choice under Mixed Public/Private Pension Provision", *Fiscal Studies*, forthcoming.

Foreword

*T*his report provides indicators for comparing pension policies across OECD countries. It gives estimates of the level of pension people will receive if they work for a full career and if today's pension rules stay unchanged.

Monika Queisser and Edward Whitehouse of the Social Policy Division of the OECD's Directorate for Employment, Labour and Social Affairs prepared the report. Rie Fujisawa and Edward Whitehouse were responsible for the pension modelling and the analysis of the tax position of pensioners. Anna Cristina D'Addio and Jongkyun Choi assisted in finalising the report.

National officials provided invaluable, active assistance in collecting information on their countries' pension and tax systems. The results have been confirmed by national authorities with the exception of those for Italy, which are based on the OECD's interpretation of parameters and rules provided by the government.*

Numerous OECD colleagues provided guidance and information, particularly Mark Pearson, Martine Durand and John Martin. The OECD private-pensions team in the Directorate of Financial and Enterprise Affairs – particularly Fiona Stewart and Juan Yermo – provided useful input to the special feature on private pensions. Delegates to the OECD Working Party on Social Policy advised on modelling procedures and development of indicators for cross-country comparisons of pension systems. They also gave constructive comments on earlier drafts.

The report is the product of a joint project co-financed by the European Commission and the OECD; the project also benefited from a financial contribution made by the government of Switzerland.

The OECD pension models use the APEX (Analysis of Pension Entitlements across Countries) infrastructure originally developed by Axia Economics, with the help of funding from the OECD and the World Bank.

---

* Italy has expressed serious doubts about the adequacy of data used in the report, and consequently about the comparability of results. In particular, baseline assumptions about labour market entry ages and career length (respectively, 20 and 45 years) are different from those agreed in a comparable exercise undertaken at the EU level, and differ from current Italian labour market norms. Italy thinks interpretations based on these data may be misleading.

Structure of the Report and Methodology

The general approach of *Pensions at a Glance* is a "microeconomic" one, looking at prospective individual entitlements under all 30 of OECD member countries' pension regimes. This method is designed to complement alternative comparisons of retirement-income systems: long-term fiscal and financial projections (for example, Dang *et al.*, 2001; and European Union, 2006) and analysis of income-distribution data (such as Förster and Mira d'Ercole, 2005; and Disney and Whitehouse, 2001).

The report is divided into three main parts. Part I presents the information needed to compare pension policies in a clear, "at a glance" style. It starts by showing the different schemes that together make up national retirement-income provision. Next, there is a summary of the parameters and rules of pension systems.

This is followed by eight main indicators that are calculated using the OECD pension models.

- The first two are the most familiar to pension analysts. Both are replacement rates, *i.e.*, the ratio of pension benefits to individual earnings. These are given in gross and net terms, taking account of taxes and contributions paid on earnings and on retirement incomes. Two analyses of the sensitivity of the gross replacement rate follow. The first looks at individuals who enter the pension system later than the baseline assumption, while the second considers the importance of investment returns in pension systems with defined-contribution (DC) components.

- The next two indicators are pension wealth, again given in gross and net terms. Pension wealth is a more comprehensive measure of pension entitlements than replacement rates because it takes account of pension ages, indexation of pensions to changes in wages or prices and life expectancy.

- Countries differ in the way that their pension systems aim to provide an old-age safety-net or replace a target share of pre-retirement income. The balance between these two is explored by the next pair of indicators: the first on the progressivity of the pension benefit formula and the second on the link between pension and earnings.

- The final two indicators aim to summarise the pension system as it affects individuals across the earnings distribution, showing the average pension level, pension wealth and the contribution of each component of the retirement-income system to overall benefits.

Two special chapters form Part II of this report. They cover pension reforms and private pensions, respectively. Both of these analyses use the OECD pension models to explore more deeply the central issues of pension policy in national debates. The framework of *Pensions at a Glance* is forward-looking, focusing on future pension entitlements of today's

workers. However, the past decade has seen intense reform activity in the world of pensions and retirement. The first special chapter looks at what countries did and how this is likely to affect future benefits. A number of these reforms have increased the role of the private sector in pension provision. The second special chapter identifies the complex range of private retirement arrangements and quantifies the savings effort individuals will have to make to maintain standards of living in retirement.

Finally, Part III provides detailed background information on each of the 30 countries' retirement-income arrangements. These include pension eligibility ages and other qualifying conditions; the rules for calculating benefit entitlements; the treatment of early and late retirees; and more detailed information on the pre-reform scenarios explored in the special chapter on pension reforms. The country studies summarise the national results in standard charts and tables.

The remainder of this section describes the methodology used to calculate pension entitlements. It outlines the details of the structure, coverage and basic economic and financial assumptions underlying the calculation of future pension entitlements on a comparative basis.

Future entitlements under today's parameters and rules

The pension entitlements which are compared 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 2004 are included where sufficient information is available (in Portugal, for example). Some changes (such as the increase in pension age in Germany and the reform package in the United Kingdom) have not been finalised or were finalised too late for inclusion.

The values of all pension system parameters reflect the situation in the year 2004. The calculations show the pension entitlements of a worker who enters the system today and retires after a full career. The results are shown for a single person only.

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 years for retirement at 65, etc. As the results can be sensitive to the career-length assumption, calculations are also made for situations where workers enter at age 25 and so retire with five years less than a full career.

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.

Systems with near-universal coverage are also included provided they cover at least 90% of employees. This applies to schemes such as the occupational plans 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 is shown with voluntary pension schemes in the special chapter on private pensions.

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 voluntary pension schemes in those countries where they are modelled).

Pension entitlements are compared for workers with earnings 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 30 countries. 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 comparisons 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:

- real earnings growth: 2% per year (given the assumption for price inflation, this implies nominal wage growth of 4.55%);
- individual earnings: 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;
- price inflation: 2.5% per year;
- real rate of return after administrative charges on funded, defined-contribution pensions: 3.5% per year;
- discount rate (for actuarial calculations): 2% per year (see Queisser and Whitehouse, 2006 for a discussion of the discount rate);
- mortality rates: the baseline modelling uses country-specific projections (made in 2002) from the United Nations/World Bank population database for the year 2040;
- earnings distribution: composite indicators use the OECD average earnings distribution (based on 18 countries), with country-specific data used where available.

Changes in these baseline assumptions will obviously affect the resulting pension entitlements. The indicators are therefore also shown for alternative assumptions regarding the rate of return on funded defined-contribution schemes. 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 real rate of return on defined-contribution pensions is assumed to be net of administrative charges. In practice, this assumption might disguise genuine differences in administrative fees between countries (see Whitehouse, 2000 and 2001 for an analysis).

The calculations assume the following for the pay-out of pension benefits: when DC benefits are received upon retirement, they are paid in the form of a price-indexed life annuity at an actuarially fair price. This is calculated from mortality data. 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 taxes and social security contributions which were used to calculate the net indicators for 2002 were included in the country chapters in the first edition of *Pensions at a Glance* (OECD, 2005). The tax and social security contribution rules and parameters have been updated to 2004 but are not repeated in this volume for reasons of space (Fujisawa and Whitehouse, forthcoming 2007, provides more information).

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 2004 can be found in the OECD report *Taxing Wages* (OECD, 2006). The conventions used in that report, such as which payments are considered taxes, are followed here.

Average earnings

Starting with this edition, *Pensions at a Glance* uses a new and more comprehensive measure of average earnings corresponding to an "average worker" (AW). This is broader than the previous benchmark of the "average manual production worker" (APW). This new concept was introduced in the report *Taxing Wages* (OECD, 2006) and also serves as benchmark for *Benefits and Wages* (OECD, 2007).

The reasoning behind the change was that a manual worker in the production sector is not representative of the "typical taxpayer", given the steady decline in manual employment in manufacturing in most OECD countries. The new base for calculating average earnings includes more economic sectors and both manual and non-manual workers. The concept and definition of earnings, however, remains the same: gross wage earnings paid to average workers, measured before deductions of any kind, but including overtime pay and other cash supplements paid to employees.

Table 0.1 reports average earnings levels under the old (APW) and new (AW) definition, for the year 2004. Only three countries (Ireland, Korea and Turkey) are not yet able supply earnings data on the broader basis and so the modelling is based on the old, APW measure of average earnings.

The effect of broadening the types of workers covered has very different effects on measured average earnings in different OECD countries. In 19 of the 27 countries for which new, AW data are available, these are *higher* than average earnings under the previous, APW definition but the size of the difference varies greatly (see Figure 0.1). The change in definition increases measured average earnings by 30% or more in six countries (Austria,

Table 0.1. **OECD measures of average earnings, 2004**

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

	OECD measure of average earnings				Exchange rates with USD	
	Old – National currency (APW)	New – National currency (AW)	New – USD, market price	New – USD, PPP	Market price	PPPs
Australia	52 777	48 827	35 922	35 917	1.36	1.36
Austria	24 946	32 872	40 842	37 872	0.80	0.868
Belgium	32 281	35 578	44 205	41 151	0.80	0.865
Canada	40 912	38 945	29 933	31 269	1.30	1.25
Czech Republic	213 573	209 489	8 153	14 936	25.69	14.03
Denmark	323 900	316 500	52 860	37 684	5.99	8.40
Finland	29 152	31 539	39 186	32 372	0.80	0.974
France	23 087	29 549	36 713	32 199	0.80	0.918
Germany	34 088	41 046	50 998	45 898	0.80	0.894
Greece	12 525	17 360	21 569	24 996	0.80	0.695
Hungary	1 262 712	1 697 268	8 377	13 682	202.61	124.05
Iceland	2 849 554	2 770 000	39 463	29 461	70.19	94.02
Ireland	30 170	n.a.	37 485	30 321	0.80	1.00
Italy	23 044	22 053	27 400	25 628	0.80	0.861
Japan	4 223 100	4 943 208	45 708	37 139	108.15	133
Korea	27 356 688	n.a.	23 888	34 974	1 145.20	782
Luxembourg	32 586	39 171	48 668	42 649	0.80	0.918
Mexico	66 432	76 332	6 767	10 446	11.28	7.31
Netherlands	32 457	37 026	46 003	41 300	0.80	0.897
New Zealand	41 778	39 428	26 129	26 793	1.51	1.47
Norway	314 523	366 161	54 332	41 005	6.74	8.93
Poland	26 745	29 263	8 015	15 858	3.65	1.85
Portugal	9 372	12 969	16 113	18 344	0.80	0.707
Slovak Republic	190 000	200 722	6 228	11 679	32.23	17.19
Spain	17 913	19 828	24 635	26 215	0.80	0.756
Sweden	251 282	300 814	40 949	32 773	7.35	9.18
Switzerland	64 419	70 649	56 849	40 900	1.24	1.73
Turkey	13 959	n.a.	9 789	16 788	1.43	0.831
United Kingdom	20 560	27 150	49 747	43 881	0.55	0.619
United States	34 033	30 355	30 355	30 355	1.00	1.00

n.a.: Not available.

AW = average wage.

APW = average production worker.

PPP = purchasing power parity.

Note: Monetary values for Turkey divided by 1 000 000. Average earnings are not available on the AW measure for Ireland, Korea and Turkey.

Source: OECD (2006), p. 13; and *OECD Main Economic Indicators*.

France, Greece, Hungary, Portugal and the United Kingdom). For three additional countries the increase was 20% (Germany, Luxembourg and Sweden). In contrast, a sizeable decrease occurred only in the United States (13%), with more modest declines (of around 5% or less) in seven further countries.*

---

* Countries have endeavoured to supply data based on the new Average Wage concept. However, as when any new series is introduced, there are teething problems and different interpretations of guidelines need to be reconciled. It appears possible, for example, that the US data excludes some groups that are included in other countries' estimates of the average wage, which may partly explain the surprisingly low US average wage estimate. This issue is subject of ongoing work, and updates to the wage series will be posted on the OECD website as and when they become available.

Figure 0.1. **Percentage difference of average earnings AW levels with regard to previous APW levels, 2004**
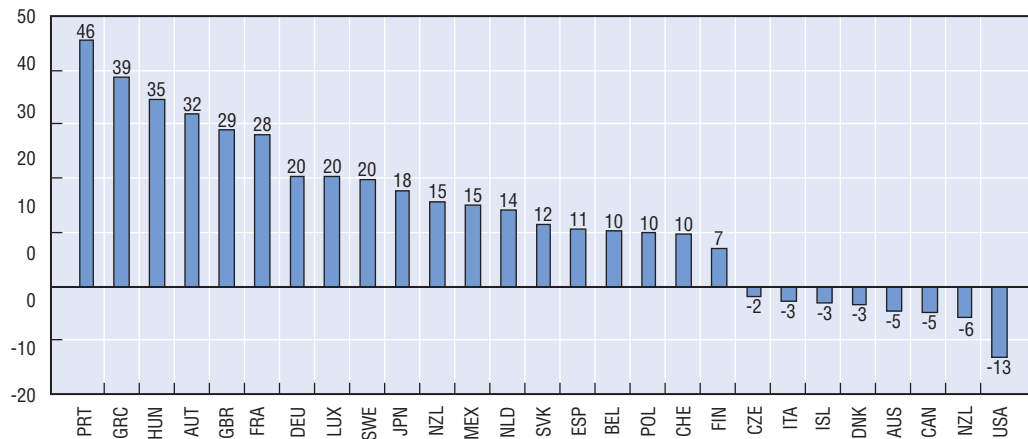
Source: OECD (2006), p. 13.

StatLink 🔗 *http://dx.doi.org/10.1787/886456570455*

Table 0.2. **Total life expectancy at age 65, 2040 projected mortality rates**

	Men	Women
Australia	84.0	87.4
Austria	83.7	87.3
Belgium	83.8	87.3
Canada	83.8	87.4
Czech Republic	82.5	86.0
Denmark	83.1	86.0
Finland	83.6	87.5
France	83.9	87.6
Germany	83.2	86.6
Greece	83.3	86.6
Hungary	80.8	85.0
Iceland	84.8	87.5
Ireland	82.8	86.2
Italy	83.0	87.0
Japan	85.8	88.7
Korea	81.8	85.6
Luxembourg	83.0	87.2
Mexico	80.9	84.8
Netherlands	83.5	86.7
New Zealand	83.6	86.8
Norway	84.2	87.5
Poland	81.5	85.6
Portugal	82.8	86.2
Slovak Republic	81.1	85.1
Spain	83.4	87.0
Sweden	84.3	87.5
Switzerland	84.5	88.2
Turkey	80.0	83.0
United Kingdom	83.3	86.4
United States	83.8	87.3
OECD average	**83.1**	**86.6**

Note: These projections build on recent national census data. The assumptions for future changes in mortality rates vary between countries but nonetheless use a consistent methodology. The resulting mortality rates can differ from national projections because of differences in assumptions.
Source: OECD calculations based on United Nations/World Bank population database.

Demographics and life expectancy

Table 0.2 shows the country-specific total life expectancy, separately for men and women, conditional on surviving until age 65. Given that pension entitlements are projected into the future, the calculations use the projections for 2040 from the United Nations/World Bank population database. Workers who enter the labour market in 2004 will retire between 2044 and 2051. Unfortunately, mortality-rate projections are available only for 2040 and 2075.

Citizens of poorer OECD member states are projected to retain lower life expectancies than their counterparts in richer economies. In Hungary, Mexico, Poland, the Slovak Republic and Turkey, life expectancy at age 65 is 1½-3 years shorter than the OECD average. Japan and Switzerland have significantly longer life expectancy than the OECD mean today and are projected to remain at the top in 2040. Other countries are clustered around the OECD average.

References

Dang, T.T., P. Antolín and H. Oxley (2001), "Fiscal Implications of Ageing: Projections of Age-Related Spending", Working Paper No. 305, Economics Department, OECD, Paris.

Disney, R.F. and E.R. Whitehouse (2001), "Cross-Country Comparisons of Pensioners' Incomes", Report Series No. 142, Department for Work and Pensions, London.

European Union, Economic Policy Committee (2006), "The Impact of Ageing on Public Expenditure: Projections for the EU-25 Member States on Pensions, Health Care, Long-term Care, Education and Unemployment Transfers (2004-2050)", *European Economy*, Special Reports No. 1/2006.

Förster, M. and M. Mira d'Ercole (2005), "Income Distribution and Poverty in OECD Countries in the Second Half of the 1990s", Social, Employment and Migration Working Paper No. 22, OECD, Paris.

Fujisawa, R. and E.R. Whitehouse (forthcoming 2007), "The Role of the Tax System in Old-Age Support: Cross-country Evidence", Social, Employment and Migration Working Paper, OECD, Paris.

OECD (2005), *Pensions at a Glance: Public Policies across OECD Countries*, Paris.

OECD (2006), *Taxing Wages*, Paris.

OECD (2007), *Benefits and Wages,* Paris.

Queisser, M. and E.R. Whitehouse (2006),"Neutral or Fair? Actuarial Concepts and Pension-System Design", Social, Employment and Migration Working Paper No. 40, OECD, Paris.

Whitehouse, E.R. (2000), "Administrative Charges for Funded Pensions: Measurement Concepts, International Comparison and Assessment", *Journal of Applied Social Science Studies*, Vol. 120, No. 3, pp. 311-361.

Whitehouse, E.R. (2001), "Administrative Charges for Funded Pensions: Comparison and Assessment of 13 Countries", *Private Pension Systems: Administrative Costs and Reforms, Private Pensions Series*, Vol. 3, OECD, Paris.

Whitehouse, E.R. (2006), *Pensions Panorama: Retirement-Income Systems in 53 Countries*, World Bank, Washington, DC.

Table of Contents

Part III

Country Studies