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Working Party on Social Policy

RETIREMENT INCENTIVES: DRAFT SPECIAL ISSUE OF "PENSIONS AT A GLANCE"

Meeting to be held at the OECD, Salle des Nations, Tour Europe, La Défense, Paris
22-23 November 2006

Box 2 has been slightly revised.

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NOTE BY THE SECRETARIAT

1. The 2005 meeting of Social Policy Ministers requested that 'the OECD should analyse the effects of pension system reforms on individual's financial and social situations and the wider economic implications of those reforms, and assess the need for further modernisation of pension systems.' A key area of pension reform has been to improve incentives for older workers to remain in the labour market, rather than taking early retirement. This report considers the current state of pension retirement incentives.

2. The paper argues that two variables need to be considered in assessing incentives for early retirement: the change in pension wealth from working an extra year, and the level of pension benefit. If there are no changes in pension wealth or it increases and the pension level is low, incentives to continue work are strong. If changes in pension wealth are negative and the pension level is high, work incentives are low. Based on the analysis in this paper, the following conclusions are drawn:

- Before age 60, the fundamental architecture of the old-age pension system in all OECD countries is pro-work. Disincentives to work come from two sources: using other benefits as a pathway into inactivity, and the use of credits that subsequently provide old-age benefits even when people have not worked or contributed.

- For workers on average earnings, incentives to work from age 60 to 65 are low in France, Greece, Hungary, Italy, Luxembourg and Portugal. In these countries, pension entitlements already accrued at age 60 are high, and pension wealth declines if people work beyond age 60. Lesser problems exist in Australia, Austria, Korea and Spain.

- For low-income workers, in incentives to work from age 60 to 65 are lowest in France, Greece, Hungary, Luxembourg and Sweden. Lesser problems exist in Belgium, Italy, Portugal, Czech Republic and New Zealand.

- Working beyond the age of 65 is penalised particularly heavily in Australia, Denmark, France, Belgium, Greece and Spain.

3. The paper identifies eight features of pension systems which undermine work incentives: low reductions in benefits for early retirement; resource tests; high levels of pension wealth; benefit formulae which have higher pension accruals at younger ages; pensions based on a limited number of 'final' or 'best' years of earnings; systems that require contributions to continue to be paid, even when little or no extra benefit is earned; means tests that prevent or penalise people combining work and pension; and small increments for people deferring retirement.

4. The intention is to publish an extended version of this paper, together with detailed country chapters (which can be found at DELSA/ELSA/WP1(2006)2/ANN), in a special edition of *Pensions at a Glance.* This would be published after the publication of the next regular edition of *Pensions at a Glance* (which in turn is expected to be released in the first half of 2007). The analysis of the current paper will be extended in several ways in that publication. First, the effects of pension credits for periods spent in unemployment will be considered. Second, the analysis will include the effects of taxes on pensions. Third, an overall measure of the financial incentives facing older workers will be created by adding the

changes in pension wealth (as calculated in this paper) to the marginal effective tax rates facing older workers, as calculated in the study *Benefits and Wages.* This special issue of *Pensions at a Glance* will be released during 2007.

5. The present paper and the ongoing *Pensions at a Glance (PaG)* project will in future be used by the Economics Department of the OECD in their work on structural indicators of economic reform, as included in the publication *Going for Growth (GfG).* Up to now, the Economics Department has developed its own long time series of retirement incentives, based on co-operation with, but separate from, work undertaken in DELSA. The indicator measure used in this work has been the change in pension wealth, adjusted by contributions made to pension funds. The GfG is therefore closely related to the measures of incentives presented here. However, the GfG series also takes into account selected pathways into early retirement, including (depending on the country), unemployment, social assistance and disability. Therefore, the GfG series cannot be replaced by the PaG series. Rather, the intention is to base the future GfG series on the calculations and information collected in the PaG process. Countries will not be asked to provide information about old-age pension systems separately to the Economic Department.

6. Delegates are asked to:

- COMMENT on the analysis of pension retirement incentives.
- COMMENT on the policy implications of this analysis.
- NOTE the intention to publish an extended version of this note as a special issue of *Pensions at a Glance.*
- NOTE the co-operation which will take place within the Secretariat to ensure that the *Going for Growth* time series of retirement incentives embedded in old-age pension systems can be maintained without adding to the burden on Member countries to provide information and verify results.

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RETIREMENT INCENTIVES:
DRAFT SPECIAL ISSUE OF *PENSIONS AT A GLANCE*

1. Introduction

7. Retirement incentives matter for both efficiency and equity reasons. There is a mountain of evidence that incentives affect retirement behaviour in both national and cross-country studies. Getting retirement incentives "right" is therefore a central concern of pension reforms.

8. Of course, retirement incentives are not the be-all and end-all in explaining participation of older workers in the labour market. Appropriate incentives to keep working are rarely a sufficient solution to the problem of early retirement, but they are almost certainly a necessary part of the solution.

9. Moreover, retirement incentives matter for equity reasons. People who work more and contribute more *should* have higher pensions. Equally, those who are forced to drop out of employment early, perhaps through no fault of their own, need to have a reasonable standard of living. The aim should be to have a pension system which neither excessively subsidises, nor excessively penalises, early retirement.

10. This paper extends the OECD pension models (OECD, 2005) to look at pension entitlements who leave the labour market at different ages. In doing so, this study builds on previous analyses of retirement incentives, both by the OECD and others, and enriches the cross-country evidence in three main ways.

11. First, previous studies were often concerned with the link between retirement incentives and retirement behaviour. For example, the influential 11-country study organised by Gruber and Wise (1998, 1999) aimed to measure retirement incentives for individuals reaching age 65 in 1995 taking account of past changes in the pension system. The OECD has in the past adopted a similar approach (Blöndal and Scarpetta, 1999, Duval, 2003). These studies are therefore explicitly backward looking, since they are based on the parameters and rules of old pension systems. Given the scale and frequency with which pension systems have been reformed, it is also important to look forward at the retirement incentives faced in the future by today's workers. This allows an assessment of recent changes to pension systems — such as the introduction of defined-contribution and notional-accounts plans — which have not been around long enough to affect the results of backward-looking studies.

12. Secondly, the current analysis is decomposable, showing separately the effects of different components of the retirement-income system. Previous cross-country studies of the pension incentive to retire (including OECD, 2001 and Casey *et al.*, 2003 in addition to those cited above) have only produced aggregate figures for incentive measures. Decomposition identifies which parts of the pension system and which of their parameters and rules affect the pension incentive to retire and so permits concrete policy proposals to improve incentives to work. These decompositions are reported in detail in the country chapters (DELSA/ELSA/WP1(2006)2/ANN) and are drawn upon when identifying which particular features of the pension system reduce the incentive to work.

13. Thirdly, the calculations have been carried out across the earnings range, from 50% to 250% of economy-wide average earnings. In contrast, Gruber and Wise focused only on the median earner and Blöndal and Scarpetta and Duval give results averaged across three different earnings levels (60, 100 and

140% of mean earnings). The results here show that retirement incentives can differ hugely between different earnings levels and considering a single case or averaging across a small number of cases will not capture this effect.

14. However, this paper is more limited than some other studies in two respects. First, it looks only at *old age pension* incentives to retire. It does not consider the alternative pathways into early retirement (e.g. unemployment, disability). If the objective is to explain empirically how strong is the incentive to stop work for older workers, this is an important drawback. If, for example, most people aged over 60 receive unemployment benefits before claiming their retirement pension at age 65, and very few claim the old-age pension from age 60, what is measured here is not 'realistic' of the incomes which older workers might receive. What this paper does instead is to identify the *pension* incentives to retire, and identifies the detailed features of the pension system which need to be changed if older workers are to face reasonable incentives to keep on working. It is possible, indeed likely, that other benefits have to be reformed as well before this is achieved for all older workers. Second, it does not (for the moment) include the impact of taxes on pensions and on earnings. Obviously, even if two countries have identical pension systems, if one has a higher tax rate the overall incentive to work is lower in that country. This is an issue that will be addressed in future work.

2. Measuring retirement incentives

15. Work incentives have traditionally been measured by the relationship between incomes in and out of work (for example, in the annual OECD Benefits and Wages reports). Applying this framework to pensions and the retirement decision is simple: out-of-work income is the retirement pension, in-work income is earnings and the ratio between the two is the conventional replacement rate. However, when it comes to pensions and retirement, the calculation needs to take account not only of the potential out-of-work benefit at a given point in time, but also of the change in pension entitlements that results from continuing in work.

16. This paper looks at individual retirement-income entitlements and how they are altered by the choice of age of leaving the labour market. The measures are based around the concept of "pension wealth", which is the present value (or stock) of the flow of pension benefits, taking account of discounting, mortality, indexation of pension payments etc. This is defined formally in Queisser and Whitehouse (2006) and OECD (2005, Part I, Chapter 6).

17. As in previous studies, the change in pension entitlement from working an additional year is central. Table 1 shows the main factors that might affect the pension incentive to retire, looking at the effect of working an extra year on pension entitlements. In each case, it is assumed that workers delay claiming the pension. If they are able to combine work and pension receipt, then there is no pension effect on incentives to retire.

18. The effects on pension incentives to retire are grouped into three kinds of change: first, arising from the longer period that the individual remains in work; secondly, from the shorter period for which the pension is claimed and, thirdly, the "actuarial" cost in delaying the pension claim, principally that the individual might die during the period of deferral.

19. The first type of factor affecting pension incentives to retire arises from the longer working period. This affects pension rights in many different ways. In all kinds of pension schemes, the extra year's contribution usually brings some extra pension entitlement. In most DB and points schemes (and occasionally with notional accounts), the right to retire depends on the number of years of contributions. So the extra year's contributions may help the individual meet these qualifying conditions. These first two

factors — shown in the first two rows of Table 1 — relate to the additional pension entitlement earned during the year.

20. In contrast, the next two factors, although again under the effect of a longer working period, result from changes to the value of pension entitlements already accrued. In DB plans, earlier years' earnings are typically "valorised" to allow for changes in costs and standards of living from the time that entitlements were earned to the time that pensions are claimed. The parallel effect in a DC scheme is that the balance in the individual account that had built up at the beginning of the year earns investment returns during the year. In notional accounts, the same thing happens but using the notional interest rate. In point schemes, the corollary is the uprating of the value of the pension point, which increases previously accrued entitlements. These factors are shown in the third row of Table 1.

21. Finally, some DB and points schemes calculate the entitlement on a subset of years of earnings ("best" or "final" pay, for example). In these cases, individual earnings might (even after valorisation or uprating of the point cost) be higher than in an earlier year. Similarly, some countries have a maximum number of years of accrual. So an extra year of work might not bring any extra entitlement, but an earlier year with lower earnings might drop out of the pension formula. These effects — which again relate to the extended duration of work — are shown in the fourth row of Table 1.

Table 1. Factors affecting the pension incentive to retire in different kinds of pension plan

	Defined benefit	*Defined contribution*	*Points*	*Notional accounts*
Longer working period	Extra year's entitlement	Extra year's contributions	Extra year's entitlement	Extra year's entitlement
	Extra year towards qualifying conditions	—	Extra year towards qualifying conditions	Extra year towards qualifying conditions
	Valorisation of earlier years' earnings	Investment returns on accumulated balance	Uprating of pension-point value	Notional interest on accumulated notional capital
	Higher earnings replace earlier, perhaps lower, earnings in benefit formula	—	Higher earnings replace earlier, perhaps lower, earnings in benefit formula	—
Shorter retirement duration	Forgo a year's benefits	Forgo a year's benefits	Forgo a year's benefits	Forgo a year's benefits
	"Actuarial" adjustment	Lower annuity factor	"Actuarial" adjustment	Lower annuity factor
Delay in claiming	Probability of dying	Probability of dying	Probability of dying	Probability of dying
	Discounting	Discounting	Discounting	Discounting

22. The second type of change to pensions from working a year longer stems from the shorter duration of retirement. In every kind of pension scheme, the individual must, of course, forego a year's benefits if he or she retires a year later. However, there are often adjustments to the value of benefits to reflect this. In DB and points schemes, this comes through "actuarial" adjustments for early or late retirement. In DC schemes and notional accounts, the route is through the annuity calculation whereby the accumulated balance is converted into a retirement-income stream. This calculation reflects the expected duration of retirement.

23. The final element of the pension incentive to retire reflects further costs to the worker of delaying the pension claim. The first is that the worker might die during the year, and so receive nothing out of the pension system. This is not taken into account in the annuity calculations in DC and in most (but not all – see below) notional accounts schemes, because these are made at the time of retirement and so implicitly assume that the worker will still be alive to claim the pension. The second is discounting. Money in the future is worth less than money now because of the opportunity cost of forgoing consumption.[1]

24. Taking into account all these multiple factors affecting pension entitlements, as outlined in the table, the change in pension wealth is then normalised to individual gross earnings to illustrate pension incentives to retire. Hence, Gruber and Wise (1999) argue that one can interpret the change in pension wealth from working an additional year as an implicit tax or subsidy.

25. This measure compares directly the two flows of income: one from retiring immediately, the other from working an additional year and then claiming the pension. The difference between the two income flows is earnings during the year plus the implicit tax or subsidy in the pension system, since this is measured relative to individual earnings.

2.1 Levels and changes

26. Previous studies have emphasised the change in pension wealth as the key measure of retirement incentives.[2] But this misses the obvious point that the level of pension wealth also matters. The latter is akin to an "income effect". People who are richer in terms of pension wealth are more likely to retire however large the change in pension wealth from working an additional year.

27. This paper presents estimates of both changes and levels of pension wealth for people leaving the labour market at different ages.

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1 This analysis is related to discussions of actuarial neutrality. Queisser and Whitehouse (2006) define an actuarially neutral pension system as one in which the present value of accrued pension benefits for working an additional year is the same as in the year before (meaning that benefits increase only by the additional entitlement earned in that year). Conversely, retiring a year earlier should reduce the pension benefit both by the entitlement that would have been earned during the year and by an amount to reflect the longer duration for which the pension must be paid.

2 For example, Gruber and Wise (1998, 1999), Blondal and Scarpetta (1999), Duval (2003) and Casey et al (2003).

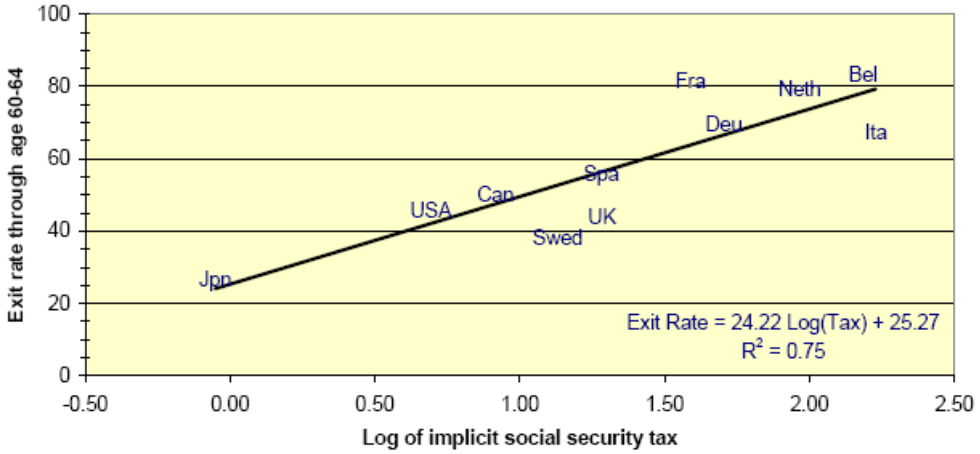
Box 1. Retirement incentives and retirement behaviour: international evidence

There have been various attempts to assess just how important are retirement incentives in explaining retirement behaviour. Results of two of the most well-known papers are shown below, presented in a way which permits direct comparison (Burtless, 2004). The elasticity of labour force withdrawal to the change in the implicit social security tax is 0.41 in the Gruber and Wise study, against 0.28 in the Blondal and Scarpetta work. In each case, the effect is statistically significant.

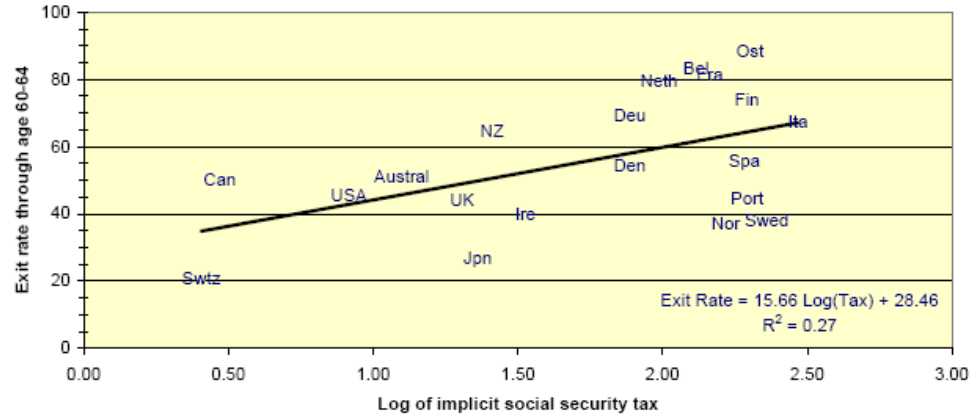
The different size of the effect does not reflect differences in the countries included in the two studies (Burtless, 2004). Rather, the cause is that estimates of the 'implicit tax on remaining in work' vary across the two countries. This in part reflects the fact that different years are being reflected in the different studies. It also reflects different assumptions about, for example, people were working or not before retiring. Some other differences are harder to explain away.

Figure 1. Labour-force exit and implicit tax on remaining in work

A. Gruber and Wise: 11 OECD countries



B. Blöndal and Scarpetta: 20 OECD countries

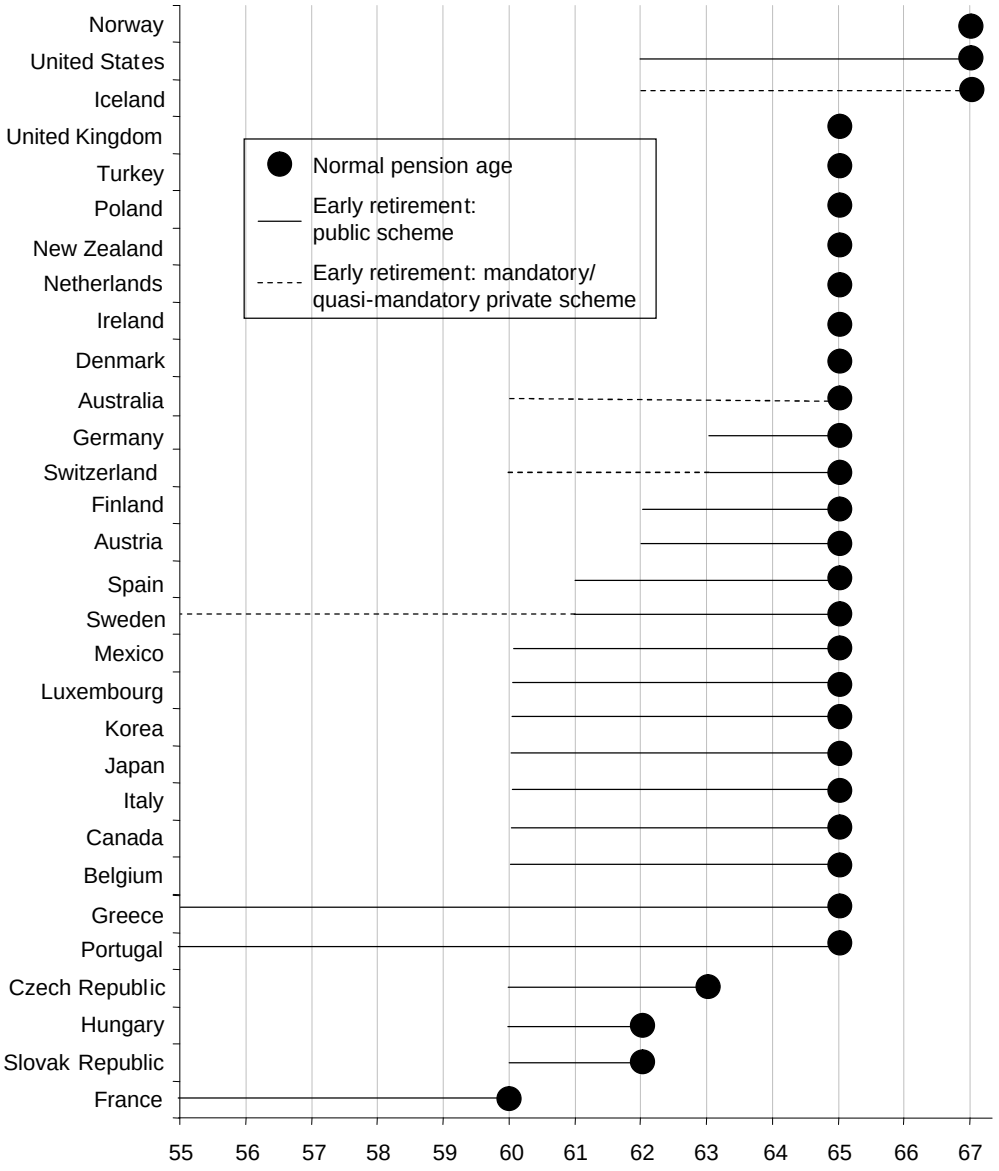


Source: Burtless (2004) based on Gruber and Wise (1998, 1999) and Blöndal and Scarpetta (1999).

3. Retirement windows: early and normal pension eligibility ages

28. Most OECD countries currently have a normal pension eligibility age of 65 and others are gradually increasing their pension ages to reach this level, as shown by the globules in Figure 2. Normal pension age is already 67 in Iceland and Norway. In the United States, it is currently between 65 and 66, but will increase to 67 in steps. At the other end of the scale, normal pension age is (or will be) 62 in Hungary and the Slovak Republic and 63 in the Czech Republic. France retains a normal pension age of 60.

Figure 2. Retirement windows: normal and early pension ages for men



Note: Pension ages for women are different in some cases: see text. Some countries do not explicitly define a "normal" pension age. The country chapters in the Annex explain the reasoning behind the value shown here.

29. Only four countries currently plan to have a different pension age for women in the long term. Italy and Poland will have normal pension age of 60 for women and 65 for men. The Czech Republic will permit women to retire between 59 and 63 depending on how many children they have. Switzerland will keep a slightly lower pension age for women: 64 rather than 65.

30. In 8 countries, pension ages are currently different between men and women, but are being equalised gradually. These are Austria, Belgium, Greece, Hungary, Japan, the Slovak Republic, Turkey and the United Kingdom.

31. The lines in Figure 2 illustrate the opportunities for early retirement on an old-age pension. Early retirement is not possible in 8 countries, including Ireland, New Zealand, Poland and the United Kingdom. In Turkey, it will not be possible to retire before 65, albeit only when the recent pension reform is fully in place (from 2047 for men and 2049 for women). In some countries, there are separate early-retirement programmes. These retain very broad coverage in Denmark and Norway, but since they are voluntary, they are excluded from the baseline analysis in this paper. The Netherlands aims to abolish its early-retirement programme in the near future.

32. The most common early retirement window — available in 7 countries — is between age 60 and 65. Another 6 countries allow individuals to draw an early public pension from 61-63. Four countries with mandatory or quasi-mandatory private pension provision allow for earlier withdrawal of private retirement benefits than public pensions. In Australia, for example, the public pension cannot be claimed before 65 but the mandatory defined-contribution pension can currently be withdrawn from age 55, rising gradually to age 60. Swedish occupational pensions, which presently are a mix of defined-benefit and defined-contribution components, can be taken as early as 55. However, the public pension and the mandatory defined-contribution scheme can only be claimed from age 61.

33. There are 15 different retirement "windows" between early and normal pension eligibility ages among the OECD countries, as illustrated in Figure 2. The empirical analysis that follows focuses on three age ranges.

34. The retirement window of primary concern for analysis of the old-age pension system is that from age 60 to 65. Two-thirds of countries allow some flexibility of retirement choice over that age range. Also, average effective retirement ages lie in this range in around two-thirds of OECD members. In most countries, the normal pension age is 65 or higher, and so this age range covers purely "early" retirement. In some cases, however, normal pension age is lower than 65 and this age range includes a mix of "early" and "late" retirement.

35. The second age range analysed is between 55 and 60. In only four countries — France, Greece, Sweden and Portugal — is it possible to claim the pension at these ages. However, in other countries, the choice of whether to continue working or withdraw from the labour market at this point affects future retirement-income entitlements in very different ways.

36. The final range of analysis is between 65 and 67. Given that the vast majority of OECD countries have a normal pension age of 65, this generally represents a period of "late" retirement.

4. Pension incentive to retire

4.1 Baseline case: average earner, age 60-65

4.1.1 Change in pension wealth

37. Real-world pension schemes are often very complex. An example of how to get from the provisions of a pension system to changes in pension wealth is provided in Box 2.

Box 2: Retirement incentives in a generic DB plan

Suppose a DB scheme uses individual lifetime average earnings as an earnings measure in the benefit formula. Earlier years' earnings are "valorised" in line with economy-wide average earnings. The plan is assumed to pay 1% of earnings for each year of coverage. The calculations are for a full-career worker, contributing each year from age 20 to the age of labour-market exit. The normal pension eligibility age is assumed to be 65. Early retirement is possible starting at age 60, subject to benefit adjustments. Workers can also choose to work beyond the age of 65. The decrement for early retirement and the increment for late retirement are both assumed to be 6% per year. If the individual works a complete career of 45 years with an accrual rate of 1%, then the replacement rate at age 65 would be 45%. The pension would be smaller if the individual left the labour market early because there would be fewer years' contributions and thus lower pension entitlements.

The measure used to determine the retirement incentives is the change in pension wealth at different ages of labour-market exit compared to retirement at 65. Table 2 breaks down the steps of the calculation empirically.

The first column of Table 2 shows the range of labour-market exit ages from 55 to 70. This is the age at which people are assumed to withdraw from the labour market and stop contributing to the pension system. The second column shows the pension eligibility age. People leaving the labour market before age 60 have to wait until age 60 to get a pension, when they become eligible for early retirement. Above age 60, it is assumed that the pension is claimed at the age at which the person leaves the labour market. The third column shows the total number of years of contributions that have been made at the point of labour-market exit. It is assumed that people working beyond 65 do not have to contribute anymore and thus earn no extra pension entitlements. Thus, people who leave work at 65 or above all have 45 years of contributions when they retire. Their replacement rate, however, increases with work above 65 due to the increment for late retirement.

The fourth column of Table 7 shows the replacement rate that will be paid when the person becomes eligible for the pension (at the age shown in column 2). It is given as a percentage of individual earnings. For someone leaving work at age 55, the replacement rate is 35 x 1% = 35%, which is then reduced to reflect the fact that the pension will be drawn five years early (at age 60). The reduction is 5 x 6% = 30%, giving a replacement rate of 35% x (100 -30) % = 24.5%. After age 65, working an extra year earns no additional entitlement, but deferring the benefit earns an increment. For working until 66, the replacement rate is 45 x 1% x (100 + 6) % = 47.7%.

The final four columns of Table 2 set out the actuarial calculations. The first element is the annuity factor for pension-eligibility age. For retirement between 55 and 60 years, this is 17.3, reflecting the fact that no benefit is payable before the age of 60. After 60, this factor changes from year to year, since pensions can be claimed at all of these ages. The second element is the present value of the pension flow (PVPF) at a given age. This function, defined formally in Box 2 of Queisser and Whitehouse (2006), depends on the probability of surviving to a particular age, the discount rate and indexation procedures. The sum of the PVPF over different ages is the annuity factor.

The penultimate column shows pension wealth measured at the point of labour-market exit. It is presented as a multiple of the individual's earnings. If the individual leaves the labour market and can immediately claim the pension, then pension wealth is simply the annuity factor at eligibility age multiplied by the replacement rate. However, this is not the case for people who stop working and contributing before they can claim a pension. The pension wealth calculation needs to take account of the fact that the worker might die before claiming the pension. For example, if a worker leaves the labour market at age 55, he or she has to wait until age 60 to claim a pension. The pension wealth in this case is multiplied by the PVPF at eligibility age (which is 0.873 at age 60) and divided by the PVPF at the exit age (which is 1 at age 55). This adjustment takes account of the probability of dying between age 55 and age 60 and takes account of the fact that the pension at age 60 has to be discounted back to age 55 to allow for the opportunity cost of deferring consumption. Thus, pension wealth for leaving the labour market at age 55 is 24.5% of individual earnings (the replacement rate) multiplied by 0.873 divided by 1 (the PVPFs), giving 3.71 times individual earnings (allowing for rounding).

Table 2. Calculating changes in pension wealth

Labour market exit	*Pension eligibility age*	*Years of contributions*	*Replacement rate (%)*	*Actuarial variables*		*Pension wealth*	
				Annuity factor	*PV of pension flow*	*Level (multiple of earnings)*	*Change (% of individual earnings)*
55	60	35	24.5	17.3	1.00	3.71	10.6
56	60	36	25.2	17.3	0.97	3.91	10.9
57	60	37	25.9	17.3	0.95	4.13	11.2
58	60	38	26.6	17.3	0.92	4.36	11.5
59	60	39	27.3	17.3	0.90	4.60	11.8
60	60	40	28.0	17.3	0.87	4.86	23.2
61	61	41	31.2	16.8	0.85	5.24	20.2
62	62	42	34.4	16.3	0.82	5.62	16.9
63	63	43	37.8	15.8	0.80	5.98	13.4
64	64	44	41.4	15.3	0.77	6.32	9.7
65	65	45	45.0	14.8	0.75	6.64	-8.8
66	66	45	47.7	14.2	0.72	6.79	-12.8
67	67	45	50.4	13.7	0.70	6.92	-16.7
68	68	45	53.1	13.2	0.67	7.01	-20.4
69	69	45	55.8	12.7	0.65	7.08	-24.1
70	70	45	58.5	12.2	0.62	7.13	-27.4

Source: OECD pension models

The final column of Table 2 shows the change in pension wealth that arises from delaying labour-market exit for a year. This is not simply the subtraction of pension wealth. For example, leaving at age 64, the pension wealth is 6.32. Leaving at age 65, pension wealth is 6.64. The adjustment to calculate the change in pension wealth gives pension wealth from leaving at age 65 measured from the point of view of a 64 year old, *i.e.*, 6.64 x 0.747 / 0.773, which is 6.42. The change in pension wealth is not 6.64 – 6.32 but, instead is 6.42 - 6.32. This appears as the near 10% of earnings shown in the final column of Table 8.

The change in pension wealth is presented as a percentage of individual earnings. When the change in pension wealth becomes negative, here after age 65, it is also often called the "implicit tax" on working longer (see, for example, Gruber and Wise, 1999). A worker deciding to work beyond 65 thus loses pension wealth in this example even though the replacement rate is higher for working longer. This is because the extra pension entitlement is not sufficient to compensate for the higher mortality risk at these ages.

Pension wealth is continually increasing between age 55 and 60, when retirement becomes possible. Each extra year of contributions increases the replacement rate by one percentage point. The change in the pension entitlement for each extra year is therefore constant. But the change in pension wealth is higher the older the worker is, for two reasons. First, the nearer to the pension eligibility age, the less likely the individual is to die between leaving the labour market and becoming eligible for the pension. Although the annual mortality risk increases with age, the mortality risk is cumulated over a shorter period the nearer the individual is to pension eligibility age. Secondly, extra entitlements earned nearer to retirement will be paid sooner than those earned, say, at age 55. Individuals will value these more highly because the pension is accessible sooner.

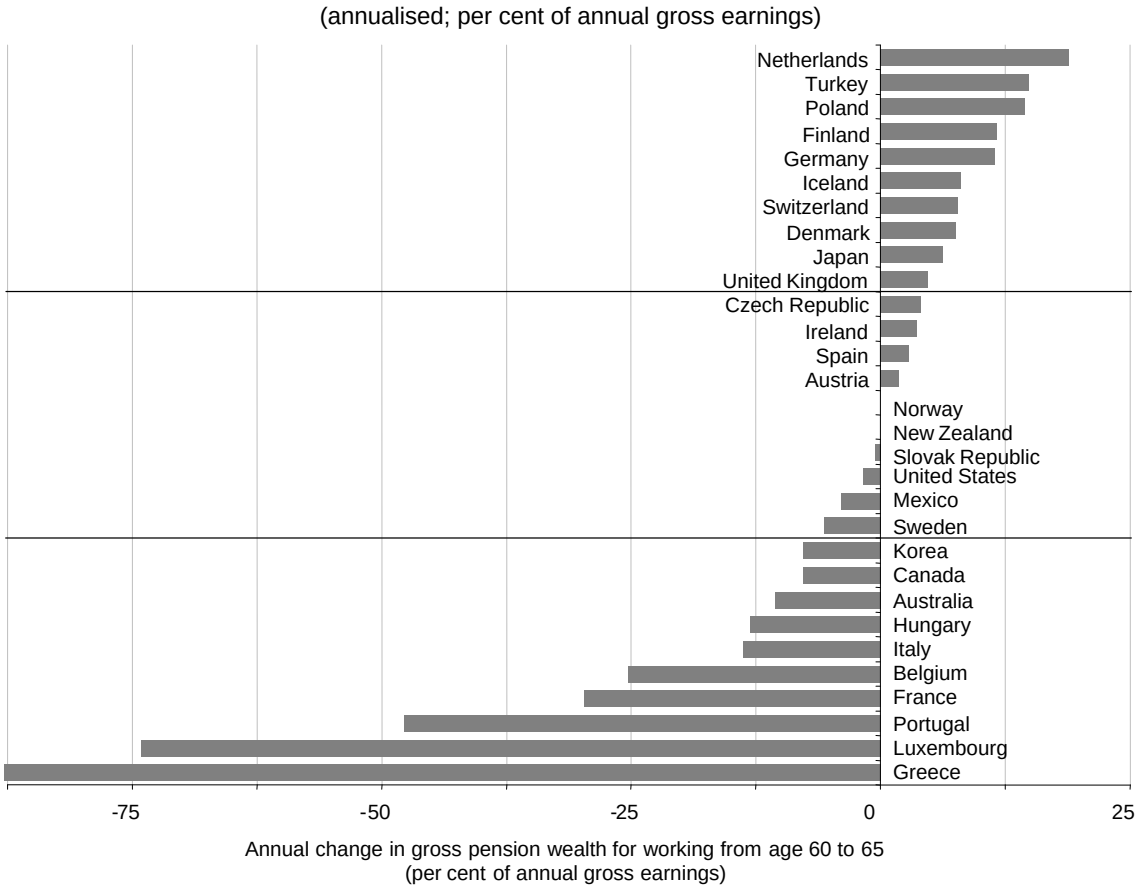
Table 2 shows that even in this simple, generic scheme, which is far simpler than most pension scheme prevailing in OECD countries, changes in pension wealth vary a lot from year to year. In order to simplify the discussion, this paper looks at incentives over broad ranges. For example, the incentives to work for 60 to 64 year olds are calculated as the average of the incentives to work from 60 to 61, 61 to 62, 62 to 63, 63 to 64 and 64 to 65, which is the same as the incentive facing a 60 year old to work right the way through to 65 then divided by 5.

38. Figure 3 shows the change in pension wealth for a man earning the economy-wide average who remains in work from age 60 to age 65. The change in pension wealth is measured as a percentage of individual earnings. The aggregate change over the age range of 60-65 is annualised. Results for single years are shown in the country annexes.

39. Workers in the Netherlands gain proportionally the most from remaining in the labour force from age 60 to 65. Although the pension there can not be claimed until 65, working additional years adds to the entitlement by an average of 19% of annual earnings for each extra year of work. This large and positive change in pension wealth is, in effect, a subsidy to remaining in work. The two flows of income coming to an individual choosing to continue in work or to leave the labour market in the Netherlands are an extra year's work for an average earner (which would increase lifetime income by 100% of average earnings, by definition) and the extra 19% of additional pension entitlement. Overall, therefore, income will be higher by 119% of individual annual earnings, taking account both of extra pay and extra pension.

40. The greatest falls in pension wealth between age 60 and 65 — in Greece, Luxembourg and Portugal — arise because full-career workers can retire at 60 with little or no reduction in benefits compared with working until 65. The loss in pension wealth of 50% or more of annual earnings is potentially a large deterrent to continuing in work.

Figure 3. Change in gross pension wealth for working from 60 to 65, man on average earnings



Source: OECD pension models

41. At the other end of the spectrum, the countries with the largest increase in pension wealth — such as Finland, Poland and Turkey, along with the Netherlands — tend to be those with the largest overall target pension level. Countries with much smaller mandatory pension systems — such as the Czech Republic, Ireland, Japan and the United Kingdom — have positive, albeit relatively small, increases in pension wealth for remaining in work.

42. Overall, Figure 3 shows that the median change in pension wealth for working between 60 and 65 in the OECD countries is zero. In most countries, pension entitlements have only a small effect on the financial rewards for leaving the labour market versus continuing in work.

4.1.2 Levels of pension wealth

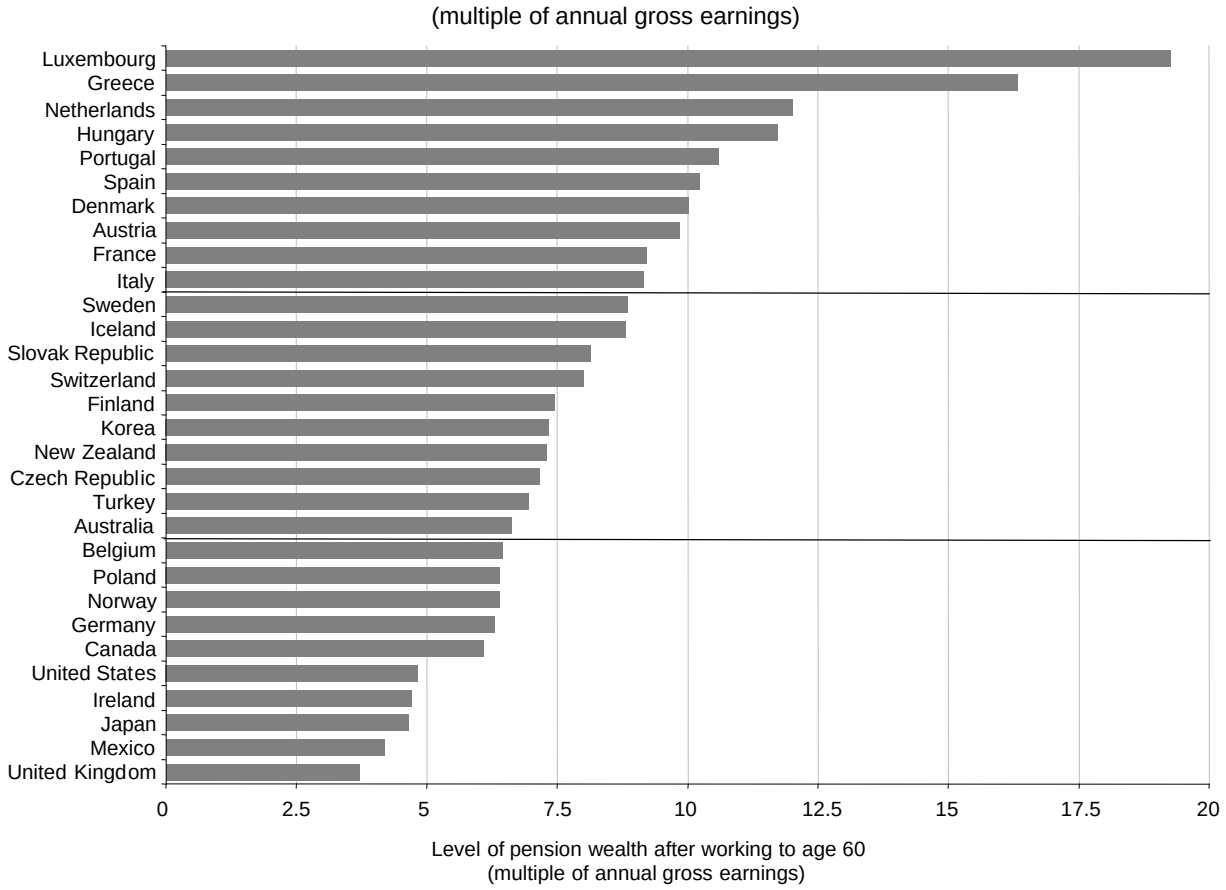
43. The second empirical measure of the pension incentive to retire is the level of pension wealth, rather than its change. If two individuals in two different countries have the same *change* in pension wealth from working longer, but one has a higher *level* of pension wealth already earned than the other, then the pension incentive to retire will be greater in the country with the higher pension.

44. Figure 4 shows the level of pension wealth to which a man is entitled for working from age 20 until age 60. In just under half of OECD countries, people are already able to claim the pension at age 60. In cases where, in contrast, people have to wait until age 65 to draw the pension, the chart shows the level of pension wealth measured at age 60. This allows for the probability that the individual might die between age 60 and 65 and therefore not receive any pension.

45. The level of pension wealth depends crucially, of course, on the pension replacement rate. However, it also depends on the likely duration of the pension payment — and so the earliest eligibility age and national life expectancy — and how the pension in payment evolves over time — and so on indexation of benefits.

46. In Luxembourg, replacement rates are relatively high, the pension can be claimed at age 60 and pensions in payment are indexed to average earnings. Pension wealth for a man working from age 20 to age 60 is 19 times his annual earnings at the time of retirement. At the other end of the spectrum, mandatory pensions in the United Kingdom cannot be claimed until 65, pensions in payment are indexed to prices and replacement rates for average earners are low. Pension wealth is 3.7 times annual earnings. In Poland, replacement rates are fairly high, but men cannot claim the pension before 65 and life expectancy is among the five shortest in the OECD. This results in a relatively low value for pension wealth.

Figure 4. Level of gross pension wealth for working until age 60, man on average earnings



Source: OECD pension models

4.1.3 Summary of the pension incentive to retire

47. Table 3 summarises the change in pension wealth for working from age 60 to 65 and the level of pension wealth already earned by age 60. The 30 OECD countries have been divided into three groups on the basis of these two measures (as illustrated by the horizontal lines in Figures 3 and 4). Countries towards the top right of the Table have stronger incentives to remain in work over this age range than countries towards the bottom left.

48. The right-hand column shows the 10 countries with the largest increment to pension wealth for working from age 60 to 65, worth 10.6% of annual earnings for each additional year of work, on average. In contrast, pension wealth declines by an average of 31.8% of annual earnings for an extra year's work in the ten countries in the lowest third. In the middle third, the change in pension wealth is zero on average.

49. The level of pension wealth already earned by age 60 averages 11.8 times annual earnings in the highest third of countries (the bottom row of Table 3). This is more than double pension wealth in the lowest third of countries (the top row of Table 3), which is 5.4 times annual earnings on average.

50. The four countries in the top right cell of the Table — Germany, Japan, Poland and the United Kingdom — all have both small levels of pension wealth in the mandatory retirement-income system for people working to age 60 and a relatively large increment to pension wealth for remaining in work until

age 65. In France, Greece, Hungary, Italy, Luxembourg and Portugal, pension wealth already earned by age 60 is relatively large. Moreover, extra years of work actually reduce pension wealth.

51. The pension incentive to retire in other countries is rather less clear cut. Ireland, Mexico, Norway and the United States do not increase pension wealth by a particularly large amount for continuing on work from age 60 to 65. But the level of pension wealth at age 60 is relatively low making retirement at that age less attractive. Working in the opposite direction, Finland, Iceland, Switzerland and Turkey have relatively large levels of pension wealth earned by age 60, but, by providing a sizeable increment to remaining in work from age 60 to 65, offset some of the wealth effect on retirement behaviour.

Table 3. Levels and changes in gross pension wealth 60-65, man on average earnings

		Change in pension wealth, working age 60-65		
		Lowest third	Middle third	Highest third
Level of pension wealth at age 60	Lowest	Belgium, Canada	Ireland, Mexico, Norway, United States	Germany, Japan, Poland, United Kingdom
	Middle	Australia, Korea	Czech Republic, New Zealand, Slovak Republic, Sweden	Finland, Iceland, Switzerland, Turkey
	Highest	France, Greece, Hungary, Italy, Luxembourg, Portugal	Austria, Spain	Denmark, Netherlands

Note: Countries grouped into thirds of the distribution of both change and level of pension wealth. Mean level of pension wealth is 5.37 times individual annual earnings for the low group, 7.66 for the middle and 11.84 for the high. Mean change in pension wealth for working from age 60-64 is -31.8% of annual earnings for the low group, 0.0% for the middle group and +10.6% for the high group.

4.2 Pension incentive to retire age 60-65: the effect of different levels of individual earnings

52. OECD countries' retirement-income systems differ substantially in the degree to which pension entitlements are linked with individual earnings when working and so it is necessary to consider not only average earners but also those at different points in the earnings distribution.

53. Tables 4 and 5 look at two measures of the pension incentive to retire for workers at different levels of earnings. Again, the focus is on the key retirement window between age 60 and 65.

4.2.1 Changes in pension wealth

54. Table 4 gives the change in pension wealth for remaining in work over this period. The 17 countries in Panel A have incentives that are broadly constant with earnings. This group includes most of the countries with a strong link between pension and pre-retirement earnings. However, it also includes some countries with a weaker or no link, such as Australia, Canada and the United Kingdom, and New Zealand.

55. Panel B in Table 4 shows four countries where incentives vary with earnings, but for different reasons. In Austria, the increment to pension wealth for low earners is larger because of the policy of progressive indexation of pensions in payment, whereby smaller pensions are fully indexed to prices but larger pensions are not. In Ireland, the basic pension is contributory (unlike in New Zealand). The gain in pension wealth is therefore larger relative to earnings per year of work for lower earners than it is for higher earners. In the Slovak Republic, retirement age is flexible provided the absolute level of the

pension reaches a certain level. Average and high earners can therefore retire earlier than low earners on reasonably favourable terms.

56. Panel C of Table 4 shows countries where the change in pension wealth is likely to encourage earlier retirement for low earners rather than for average earners. Typically, this is a result of the way targeted retirement-income programmes operate. In Mexico, for example, there is a minimum pension. Extra contributions made by low earners to the mandatory defined-contribution plan are therefore offset by reduced entitlement to the minimum pension. Similarly, the guarantee of a minimum retirement income of 85% of the minimum wage in France, social assistance in Germany, the guarantee pension in Sweden and supplemental security income in the United States mean that extra earnings-related pension entitlements earned from continuing in work beyond age 60 are partly or wholly offset. In the Netherlands, the basic pension is effectively residency tested. Earnings-related occupational benefits are only earned on pay in excess of a "franchise" amount, which means that these are higher for average and higher earners than for low earners.

Table 4. Change in gross pension wealth for working from 60-65 by earnings, men

Panel A. Incentives broadly constant with earnings

	Low (50% average)	Average	High (200% average)
Australia	-10.6	-10.6	-10.6
Canada	-7.8	-7.8	-4.1
Czech Republic	1.9	4	3.4
Denmark	8.2	7.5	11.1
Finland	10.1	11.7	11.7
Greece	-87.8	-87.8	-87.8
Hungary	-13.0	-13.0	-13.0
Italy	-13.7	-13.7	-14.9
Japan	5.8	6.2	6.2
New Zealand	0.0	0.0	0.0
Norway	0.0	0.0	0.0
Poland	14.5	14.5	14.5
Portugal	-48.4	-47.7	-46.5
Spain	2.8	2.8	2.3
Switzerland	8.9	7.8	4.1
Turkey	12.2	14.8	14.8
United Kingdom	3.9	4.7	2.8

Panel B. Incentives better for low earners than for average earners

	Low (50% average)	Average	High (200% average)
Austria	11.5	1.8	3.7
Iceland	13.6	8.0	35.8
Ireland	7.3	3.7	1.8
Slovak Republic	14.9	-0.5	-0.5

Panel C. Incentives better for average earners than for low earners

	Low (50% average)	Average	High (200% average)
Belgium	-35.0	-25.3	-14.6
France	-59.6	-29.7	-27.9
Germany	-11.0	11.5	8.7
Korea	-11.6	-7.8	-5.2
Luxembourg	-86.1	-74.1	-72.7
Mexico	-53.2	-4.0	-1.7
Netherlands	6.7	18.9	24.9
Sweden	-19.1	-5.7	2.7
United States	-16.3	-1.7	-0.3
OECD average	**-11.7**	**-7.1**	**-5.0**

Source: OECD pension models

4.2.2 Levels of pension wealth

57. Table 5 shows pension wealth as a multiple of individual earnings, again at three different pay levels: half average, average and double average. The overall averages show that OECD countries' retirement-income systems are generally progressive: pension wealth at age 60 is 10.5 times individual annual earnings for low earners, 8.3 times for average earners and 6.8 times for high earners. However, in the 9 countries in the top panel of Table 5, pension wealth is pretty much the same relative to individual earnings. These countries have a strong link between pension entitlements and pre-retirement earnings.

58. In the bottom panel of the Table, pension wealth is very much higher relative to individual earnings for low earners. These countries have strongly progressive retirement-income systems, meaning that there is little or no link between pension entitlement and pre-retirement earnings. The higher levels of pension wealth for low earners relative to pay means that the wealth effect is more likely to operate as a disincentive to continued work for low earners than for average earners.

Table 5. Levels of gross pension wealth at age 60 by earnings, men

Panel A. Pension wealth broadly constant with earnings

Multiple of individual earnings

	Low (50% average)	Average	High (200% average)
Austria	9.85	9.85	6.74
Greece	16.33	16.33	16.33
Hungary	11.72	11.72	11.72
Italy	9.17	9.17	9.08
Netherlands	12.37	12.01	11.83
Poland	6.41	6.41	6.41
Portugal	10.75	10.59	10.31
Slovak Republic	7.37	8.13	8.13
Turkey	7.08	6.95	6.95

Panel B. Pension wealth higher for low earners than for average earners

Multiple of individual earnings

	Low (50% average)	Average	High (200% average)
Finland	9.24	7.44	7.44
France	11.49	9.22	8.05
Germany	7.40	6.30	4.74
Japan	6.58	4.64	3.61
Luxembourg	21.76	19.26	18.00
Norway	7.76	6.39	4.20
Spain	10.23	10.23	8.46
Sweden	11.71	8.85	8.92
Switzerland	8.74	8.01	4.18

Panel C. Pension wealth much higher for low earners than for average earners

Multiple of individual earnings

	Low (50% average)	Average	High (200% average)
Australia	11.02	6.62	4.42
Belgium	9.11	6.46	3.75
Canada	10.19	6.09	3.08
Czech Republic	11.64	7.16	4.19
Denmark	16.40	10.02	7.24
Iceland	13.79	8.81	6.56
Ireland	9.44	4.72	2.36
Korea	10.97	7.34	4.95
Mexico	8.37	4.19	3.83
New Zealand	14.62	7.31	3.65
United Kingdom	6.57	3.71	2.03
United States	7.09	4.83	3.69
OECD average	**10.51**	**8.29**	**6.83**

4.2.3 Summary of the pension incentive to retire for low earners

59. The twin measures of retirement incentives — change and level of pension wealth — are again summarised in a simple Table. The focus of Table 6 is on the position of low earners. Countries are placed very differently from Table 3, which looked at average earners. For example, five countries — Germany, Japan, Mexico, the United Kingdom and the United States — pay among the lowest level of pension wealth for both low and average earners. However, the change in pension wealth for low earners is less than it is for people on average pay.

Table 6. Levels and changes in gross pension wealth 60-65, man on half average earnings

		Change in pension wealth, working age 60-64		
		Lowest third	Middle third	Highest third
Level of pension wealth at age 60	Lowest	Mexico, United States	Germany, Japan, Norway, United Kingdom	Poland, Slovak Republic, Switzerland, Turkey
	Middle	Belgium, Italy, Portugal	Australia, Canada, Korea, Spain	Austria, Finland, Ireland
	Highest	France, Greece, Hungary, Luxembourg, Sweden	Czech Republic, New Zealand	Denmark, Iceland, Netherlands

Note: Countries grouped into thirds of the distribution of both change and level of pension wealth. Mean level of pension wealth is 7.34 times earnings for the low group, 10.00 for the middle and 14.18 for the high. Mean change in pension wealth for working from age 60-64 is -43.2% for the low group, -2.7% for the middle group and +10.8% for the high group.

60. Retirement incentives are also different for workers at different earnings' levels in Sweden. The guarantee pension means that for low earners, Sweden is in the bottom left-hand cell, with a mix of a relatively high pension wealth reached by age 60 and a decline in pension wealth for working from age 60 to 65. France, Greece, Hungary and Luxembourg lie in this cell in the tables for both average and low earners. In Italy, the tight link between pension and earnings means that pension wealth at age 60 is in the highest third for average earners but only the middle third for low earners.

4.3 Pension incentive to retire age 60-65: the effect of assumed entry age

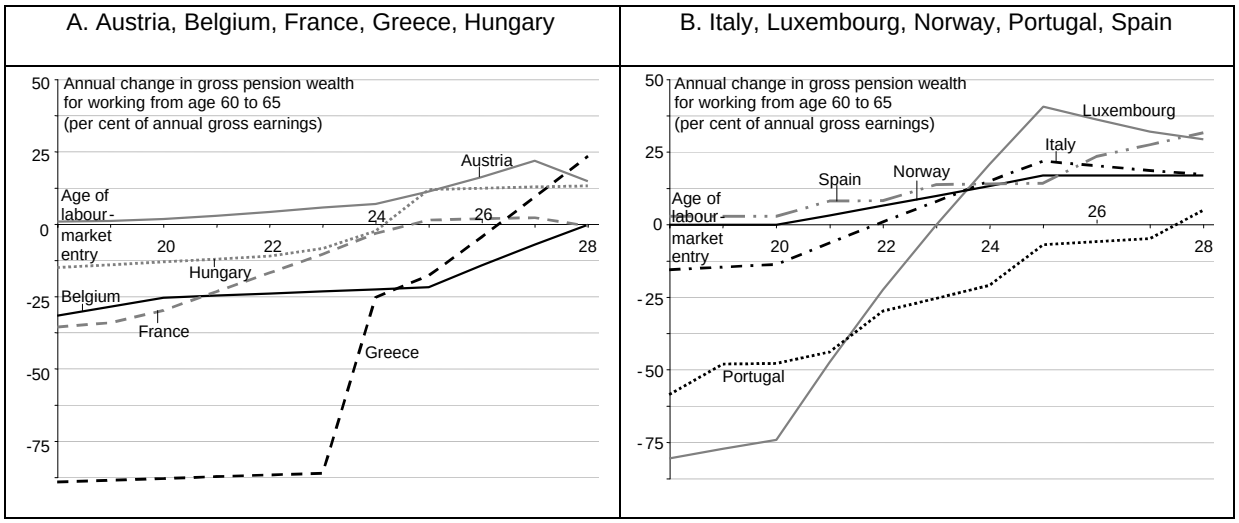
61. The baseline assumption that has been applied so far is that individuals begin work at age 20 and continue to the age of labour-market exit, which so far has been either 60 or 65. For the majority of OECD countries, the assumed age of entry to the labour market does not much affect the change in pension wealth for retiring early. However, a number of OECD countries' pension systems have rules that affect retirement incentives depending on the number of years of contributions (or credits). In ten of these countries, the assumed age of entry significantly affects the pension incentive to retire at age 60 rather than age 65, as measured by the change in pension wealth over that age range. This is illustrated in Figure 5.

62. In four countries, it is possible to retire before the normal pension age without any "actuarial" reduction in the benefit to reflect the longer expected duration of the pension payment, provided a minimum number of years of contributions have been paid. The qualifying conditions are 35 years of contributions in Belgium, 37 years in Greece, 38 years in Hungary and 40 years in Luxembourg. The interaction of this rule with other parameters and rules of the pension system mean that the measure of the pension incentive to retire can vary hugely with the assumed age of entry. In Luxembourg, for example, a 20-year-old labour market entrant can retire at 60 subject to 40 years paid or credited contributions without any benefit reduction. However, a 25-year-old entrant (provided that the years from 20 to 25 were not credited), would have to wait until 65 to receive full pension. Indeed, Luxembourg has the largest

reduction in pension wealth for working between 60 and 65 for labour-market entrants at age 20 and the largest increase in pension wealth for entry at age 25. Similarly in Greece, people entering the labour market at age 23 or lower would reach the 37-year condition for early retirement on unreduced benefits by the earliest possible age of 57.

Figure 5. Change in gross pension wealth for working from 60-65 by age of labour-market entry, men

(annualised; per cent of annual gross earnings)



Source: OECD pension models

63. In six countries, a certain number of years of contributions allow individuals to retire early, but unlike the previous examples, benefits are reduced to reflect the longer expected duration of payment. In most of these countries, the reduction in benefits is relatively low: 4.2% per year in Austria, 4.5% in Greece, up to 4.5% in Portugal and 1.2% for one year and 4.8% for two years of early retirement for men in Hungary (see Queisser and Whitehouse, 2006, for more details). In France and Spain, the adjustments are higher, but the penalty for early retirement is smaller the more years of contributions that have been paid. This again means that later labour-market entrants have a larger gain in pension wealth for continuing to work between 60 and 65.

64. In three countries, the sensitivity of the change in pension wealth to the assumed age of entry reflects a maximum number of years over which pension benefits can accrue. This is 35 years in Spain and 40 years in Norway and Portugal. This means that a 20-year-old labour-market entrant would reach maximum benefits before the normal pension age (and, in Portugal and Spain at or before the early pension age). Later entrants would not, meaning that the change in pension wealth would be higher.

4.4 Pension incentive to retire age 60-65: the effect of assumed rate of return on investments

65. Seven OECD countries have defined-contribution pension schemes as part of their mandatory retirement-income system. The baseline assumption for the rate of return on assets in individual accounts is 3.5% above price inflation. Figure 5 shows how the twin measures of pension incentive to retire — the change and level of pension wealth — vary with the assumed real rate of return. The range shown is between 2% (the same as the wage-growth assumption) to 5%.

66. In all cases, the level of pension wealth reached at age 60 (panel B) is higher the higher is the assumed rate of return. However, the impact is obviously more marked the larger the role played by the defined-contribution pension in the overall retirement-income package.

67. The impact of the rate-of-return assumption on the change in pension wealth is much more complex. In Mexico, the pattern is dominated by the effect of the minimum pension. At low rates of return, average earners would be entitled to the minimum pension if they retire early. Extra work and so extra contributions to the defined-contribution plan therefore would not increase pension wealth. However, at higher rates of return, the minimum pension is no longer relevant.

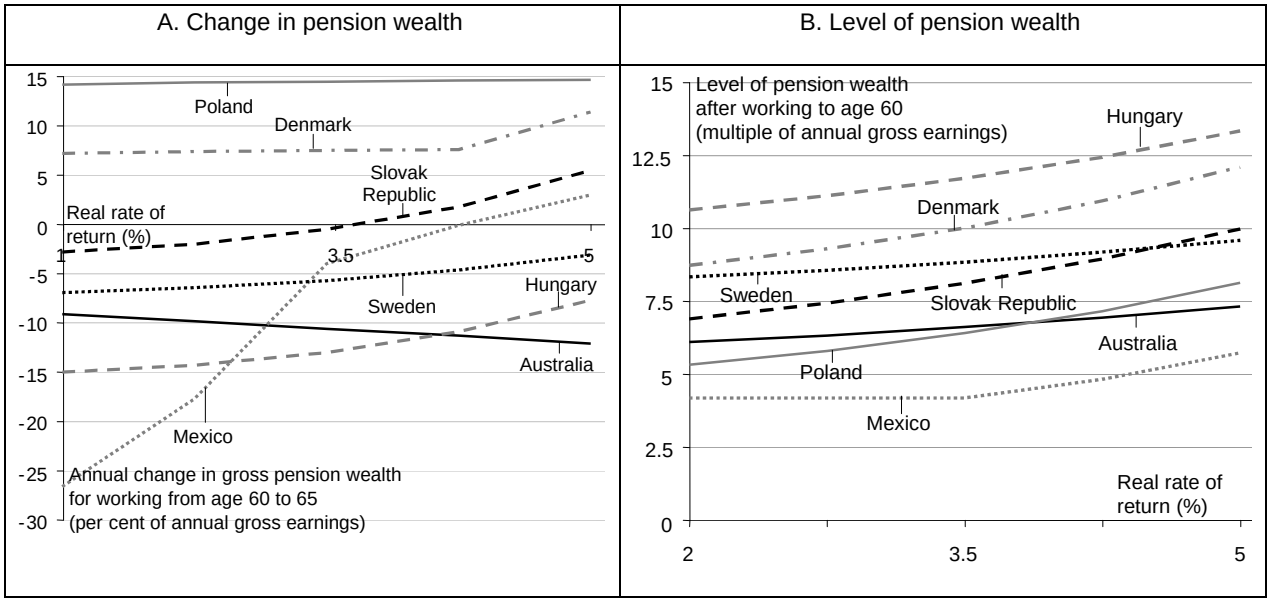
68. In Poland, by contrast, the assumed rate of return has only a small effect on the pension incentive to retire. This is because retirement is not possible before the pension age: a higher rate of return only increases the change in pension wealth from extra work by the additional returns earned on contributions made between age 60 and 65. Also, around half of the retirement-income package comes from notional accounts, where the benefits do not depend on investment returns.

69. In Hungary, the Slovak Republic and Sweden, a higher return means a larger increment in pension wealth for continuing in work between 60 and 65. The different slopes of the curves in panel A of Figure 5 reflects the different size of contributions to the defined-contribution plan, which are relatively small in Sweden and relatively large in the Slovak Republic.

70. Finally, the change in pension wealth from continuing in work between 60 and 65 declines with the assumed rate of return in Australia. This is the opposite effect from other countries. This is because of the means-tested public pension. The modelling assumes that individuals withdraw their defined-contribution pension as an annuity. The means test implies that public pension entitlement will be higher the earlier the defined-contribution pension is drawn (and so the lower its level).

Figure 6. Measures of pension incentive to work from 60-65 by rate of return on investments, men

(annualised; per cent of annual gross earnings)



71. With defined-contribution pensions, one would expect that the pension incentive to remain in work would be higher with a higher rate of return, because the reward for delaying retirement and so earning extra returns on the accumulated capital would be larger. Working in the opposite direction, the level of pension wealth (as well as the change in pension wealth from remaining in work) would be larger. Hence changes in assumed rates of return have indeterminate effects on retirement incentives.

4.5 Pension incentive to retire at different age ranges: 55-60

72. Only a few countries allow early retirement on an old-age pension before age 60: Greece and Portugal for the public pension, France for mandatory occupational plans and Sweden for quasi-mandatory occupational plans. Even though age 55-60 is not a retirement 'window' in other countries, nonetheless pension wealth changes with work decisions. These mainly reflect the accrual of pension rights at these ages.

73. The greatest differences between pension incentives to remain in work at average earnings from 55 to 60 compared with those over the 60-65 age range are in Belgium, France, Greece, Hungary, Italy, Luxembourg, Portugal and the Slovak Republic (Panel A of Table 7). These 8 countries mainly have relatively high levels of pension wealth, meaning that pension wealth increases on average by 37% of a single year's earnings for each year of additional work between age 55 and 60, which is double the OECD average of 18%. Between 60 and 65, however, the pension incentive to remain in work turns negative in all 7 cases, averaging minus 36% per year. The average across all 30 OECD countries is just minus 7%.

74. At the other end of the spectrum are 8 countries where the pension incentive to retire is positive and fairly constant between age 55-60 and age 60-65: Denmark, Germany, Iceland, Japan, the Netherlands, Poland, Turkey and the United Kingdom. (These are shown in Panel C of Table 7.) Over the 55-60 retirement window, the increase in pension wealth for remaining in work is 11.7% of average earnings per year of extra work, below the OECD average of 18% and much below the increase in pension wealth in the first set of countries. Over the 60-65 age range, the change in pension wealth is only slightly lower on average than in the earlier retirement window: 11.4%.

75. In six countries, pension wealth turns negative in the age 60-65 window. However, the different between retirement incentives at different ages in Australia, Canada, Korea, Mexico and Sweden is much smaller than in the first set of countries (compare Panels A and B of Table 7).

76. The final group of countries, shown in Panel D of Table 7, have pension incentives to retire that decline with age (like the countries in Panels A and B). However, there is no pension disincentive to continuing on work from age 60 to 65, compared with the relatively large falls in pension wealth typical of the countries in Panel A and the smaller falls in Panel B.

Table 7. Change in gross pension wealth for continuing in work by age range, men on average earnings

Panel A. Large decline with age

	55-60	60-66
Belgium	14.3	-25.3
France	37.5	-29.7
Greece	48.3	-87.8
Hungary	42.1	-13
Italy	22.6	-13.7
Luxembourg	49.2	-74.1
Portugal	42.1	-47.7
Slovak Republic	41.2	-0.5

Panel B. Smaller decline with age, going negative

	55-60	60-66
Australia	4.3	-10.6
Canada	4.6	-7.8
Korea	16.8	-7.8
Mexico	0.0	-4.0
Sweden	16.8	-5.7
United States	0.0	-1.7

Panel C. Broadly constant with age, staying positive

	55-60	60-66
Denmark	7.0	7.5
Germany	15.4	11.5
Iceland	10.6	8.0
Japan	10.8	6.2
Netherlands	16.3	18.9
Poland	12.8	14.5
Turkey	13.2	14.8
United Kingdom	6.4	4.7

Panel D. Other

Austria	22.7	1.8
Czech Republic	16.0	4.0
Finland	19.6	11.7
Ireland	10.9	3.7
New Zealand	0.0	0.0
Norway	14.7	0.0
Spain	10.2	2.8
Switzerland	23.1	7.8
OECD average	**18.3**	**-7.1**

Source: OECD pension models

4.6 Pension incentive to retire at different age ranges: 65-67

77. Most OECD countries have a normal pension age of 65. However, increasingly countries try to encourage people to defer their retirement beyond the normal pension age. This section therefore measures the pension incentive to retire over the 65-67 retirement window at average earnings.

78. In only five countries is there a gain in pension wealth from deferring the pension claim for two years from age 65: Germany, Iceland, Japan, Portugal and the United Kingdom (see Figure 7). This is because there is an increment to benefits for pension deferral, ranging from 6% in Germany to 10.4% in the United Kingdom.

79. In Luxembourg, Turkey, the Netherlands and New Zealand, the pension must be claimed at age 65. But it is possible to combine working with receiving a pension without any penalty. So the change in pension wealth for these countries is shown as zero.

80. Similar arguments apply to Austria, the Czech Republic, Finland, Poland and Switzerland. It is possible to defer the pension in these countries and earn an increment. However, the increment is too small to deliver an increase in pension wealth for deferring retirement from age 65 to 67. Nonetheless, it is possible to combine work and pension receipt, so the effective change in pension wealth is zero in these seven countries, which are highlighted in Figure 7 in light grey.

81. In all of the remaining 13 OECD countries, there is a disincentive to remaining in work after age 65, ranging from very small (Mexico, Sweden and the United States) to very large (Greece and Spain, for example). In Spain, it is necessary to retire from employment to receive a benefit: there is no possibility of combining work and pensions. The increment to pension benefits for deferring the pension claim is very small — just 2% — meaning that pension wealth would fall substantially if the pension were deferred and individuals worked from age 65 to 67.

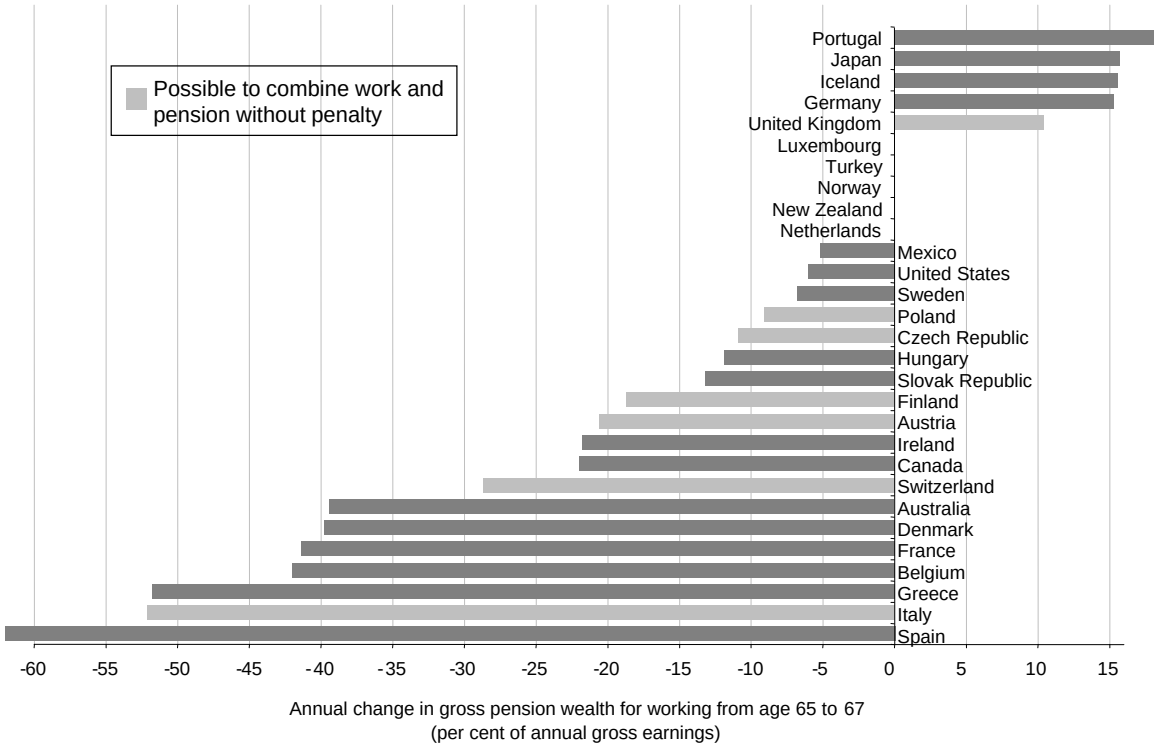
82. In Belgium and Greece, there is no benefit increment to reflect the shorter duration of payment for benefits deferred after age 65. Furthermore, the possibility of combining work and pension receipt is restricted by earnings tests.

83. In France, the increments for deferring pension benefits beyond age 65 are relatively small. Moreover, the possibility of combining work and pension is severely curtailed by the requirement that individuals must leave their usual job.

84. Disincentives to remain in work after age 65 in three countries — Australia, Canada and Denmark — are caused by the targeting of pension benefits. For example, although it is possible to defer the means-tested public pension in Australia, the bonus for doing so is smaller than the benefit foregone.

Figure 7. Change in gross pension wealth for working from 65 to 67, man on average earnings

(annualised; per cent of annual gross earnings)



Source: OECD pension models

Note: the model for Korea has not yet been finalised

5. Policy conclusions

85. In some countries, the pension system provides a powerful incentive to leave work at the earliest possible opportunity. In others, the retirement-income regime is relatively neutral over age of retirement.

86. Based on the analysis in this paper, the following can be concluded:

- Before age 60, the fundamental architecture of the old-age pension system in all OECD countries is pro-work. Disincentives to work come from two sources: using other benefits as a pathway into inactivity, and the use of credits that subsequently provide old-age benefits even when people have not worked or contributed.

- For workers on average earnings, incentives to work from age 60 to 65 are low in France, Greece, Hungary, Italy, Luxembourg and Portugal. In these countries, pension entitlements already accrued at age 60 are high, and pension wealth declines if people work beyond age 60. Lesser problems exist in Australia, Austria, Korea and Spain.

- For low-income workers, in incentives to work from age 60 to 65 are lowest in France, Greece, Hungary, Luxembourg and Sweden. Lesser problems exist in Belgium, Italy, Portugal, Czech Republic and New Zealand.

- Working beyond the age of 65 is penalised particularly heavily in Australia, Denmark, France, Belgium, Greece and Spain.

87. Because the analysis used in this paper allows the changes in pension wealth to be decomposed (see the country chapters in the annex, DELSA/ELSA/WP1(2006)2/ANN), it is possible to identify the features of pension systems which lower work incentives:

1. low (*e.g.* Hungary, Portugal) or zero (*e.g.* Belgium, Greece, Luxembourg) reductions in benefits for early retirement;

2. resource tests that encourage retirement at the earliest opportunity for low earners (*e.g.* Belgium, France, Portugal, Sweden);

3. mandatory pension benefits which deliver high levels of pension wealth even for early retirees (e.g., Luxembourg, Greece, the Netherlands, Hungary);

4. benefit formulae which have higher pension accruals at younger ages (*e.g.* Spain);

5. pensions based on a limited number of 'final' or 'best' years of earnings, which encourage people to retire once pay has peaked (*e.g.* France, Greece, Spain);

6. systems that require contributions to continue to be paid, even when little or no extra benefit is earned (*e.g.* Belgium, Greece, Norway, Spain, United States);

7. earnings tests or means tests that prevent or penalise people combining work and pension (*e.g.* Belgium, Greece, Ireland, and Australia, Canada and Denmark)

8. zero or small increments for people deferring retirement (*e.g.* France, Italy, Spain).

88. However, it should be obvious from this list that there are tradeoffs: fiscal and social objectives can clash with policies that would improve retirement incentives. These tradeoffs are less important for reforms 4, 5 and 8 in the above list, where retirement incentives are improved without compromising fiscal and social objectives.

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