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The Retirement Decision in OECD Countries

Sveinbjörn Blöndal,

Stefano Scarpetta

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by
Sveinbjörn Blöndal and Stefano Scarpetta

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ABSTRACT/RÉSUMÉ

This paper examines the main determinants of the decision to retire from the labour market in OECD countries, and in particular the role of social security systems in driving down the labour-force participation rate of older people in recent decades. It demonstrates that old-age pension systems in virtually all OECD countries in the mid-1990s made it financially unattractive to work after the age of 55, and the implicit tax on continued work has risen strongly since the 1960s in most countries. Financial disincentives to continued work have been amplified by various *de facto* early-retirement programmes, including unemployment-related and disability schemes. Pooled cross-country time-series regressions show that increased disincentives to work at older ages have contributed significantly to the drop in labour-force participation rates of older males, but also demonstrate that the deterioration of labour-market conditions in many countries has played a significant role as well.

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Cet article examine les principaux déterminants de la décision de quitter le marché du travail, dans certains pays de l'OCDE, et en particulier le rôle des systèmes de sécurité sociale dans la diminution du taux d'activité des personnes âgées dans les dernières décennies. Il démontre que dans quasiment tous les pays de l'OCDE au milieu des années 90, les systèmes d'assurance-vieillesse ont rendu financièrement peu attrayant le fait de travailler après 55 ans, et que l'impôt implicite sur la poursuite de l'activité a fortement crû depuis les années 60 dans la plupart des pays. Les contre-incitations financières à la poursuite du travail ont été amplifiés par divers programmes de retraite anticipée, parmi lesquels des systèmes liés au chômage et à l'invalidité. Les régressions des séries chronologiques transversales regroupées montrent que des contre-incitations accrues à travailler à un âge tardif ont significativement contribué à la baisse du taux d'activité des hommes âgés, mais démontrait également le rôle joué simultanément par la détérioration de la situation du marché du travail dans de nombreux pays.

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THE RETIREMENT DECISION IN OECD COUNTRIES

Sveinbjörn Blöndal and Stefano Scarpetta

I. INTRODUCTION, SUMMARY AND POLICY CONCLUSIONS

I.1 Introduction

1. The age at which people retire from the labour market has been drifting downwards in most OECD countries in recent decades. While this has been beneficial for the affected individuals, it has implied costs for society in terms of lower productive capacity and high budgetary outlays. Should average retirement ages stabilise at their current low levels, or fall even further, the adverse output and budgetary implications of ageing populations would be amplified. On the other hand, if past trends in average retirement ages were to be reversed, the ageing problem would be mitigated. It is therefore important to understand the driving forces behind the drop in labour-force participation of older workers.

2. This issue was addressed in Phase I of the OECD Ageing Project, and the main findings published in *The Transition from Work to Retirement* (OECD, 1995*a*)[1]. The report documented the salient features of the labour market for older workers, notably the decline in labour force participation and the usually abrupt transition from full-time work to full-time retirement. It also discussed the main forces which led to withdrawals from employment: special schemes created to encourage older workers to leave the labour market, and incentives embedded in old-age pension schemes and other income support programmes.

3. This paper extends the Phase-I analysis in two ways. Firstly, it documents the work incentives in the various income-support programmes intended for, or used by, older workers, and provides summary indicators that are comparable across OECD countries and over time. Secondly, it uses econometric analysis to assess the impact of these incentives on labour-force participation, and thus on the potential effects of policy changes on retirement behaviour. The income-support schemes analysed are confined to state or government-mandated programmes; occupational pensions negotiated between employers and employees are not covered.

1. The transitions for 10 countries were described in detail in OECD (1995*b*).

I.2 Summary and main findings

4. Chapter II sets the stage for the paper by briefly reviewing the evolution of average retirement ages in OECD countries since 1950 and the characteristics of workers who are already retired before the age of 65. It shows the wide disparity in average actual retirement ages across OECD countries, ranging from 57 to 70 for males, and the accompanying differences in participation rates of older workers. Self-reporting survey evidence does not show any clear cross-country pattern as to the reasons why inactive males in the 55-64 year-old age group have left their job. However, tabulations from labour-force surveys demonstrate that those already retired at ages 55 to 64 tend to be concentrated in groups with certain characteristics: those with lower educational attainment, and those working primarily in goods-producing sectors. The self-employed are much less likely to retire at younger ages than employees.

5. Chapter III demonstrates that old-age pension systems discourage work at older ages in virtually all OECD countries. As receipt of an old-age pension is typically conditional on leaving the traditional workplace or subject to means-testing with low earnings disregards, the disincentives are particularly strong after the earliest age at which pensions become available: an extra year of work implies foregoing one year of old-age pensions and often paying pension contributions for an additional year, with a little or no increase in ultimate pensions after retirement. The drop in old-age pension wealth, i.e. the discounted value of future pension streams minus pension contributions, often amounts to 50 to 80 per cent of gross income, and this implicit tax is likely to strongly discourage work beyond the pensionable age. Though to a much lesser extent than at later ages, old-age pension systems also discourage work before the pensionable age in most OECD countries: the increase, if any, in pension entitlements due to an additional year's work is insufficient to cover the extra pension contributions. The implicit tax on work after the age of 55 has increased significantly over recent decades due to the lowering of standard retirement ages, higher pension replacement rates and flatter pension accruals at older ages, and higher pension contribution rates.

6. Chapter IV shows that incentives to retire early are amplified in countries where it is possible to get access to public income support prior to the pensionable age. Income-support programmes, which were originally designed to deal with other contingencies, have been used in some countries to finance early retirement. Thus, disability programmes have been used for this purpose in several countries, notably where a labour-market criterion is explicitly used to assess entitlement to benefits. Also, unemployment-related benefits for older workers have been turned into *de facto* early-retirement benefits in many countries by extending benefit periods to the pensionable age, removing the active job-search requirement for older workers and establishing special unemployment pensions. In addition to these income-support programmes, some countries have special schemes to facilitate early retirement. The availability of these various benefits increases the disincentives to work prior to the earliest age at which old-age pensions become available: the cost of an extra year of work is not only paid pension contributions but also foregone benefits, whereas ultimate pensions are often unaffected.

7. Chapter V demonstrates that the incentives discussed above have significant effects on the retirement behaviour of older workers. The difference in participation rates of the 55-64 year-olds across countries is closely related to the drop in pension wealth from continued work. Pooled cross-country time-series regressions show that in addition to structural labour-market conditions, the variation in participation rates across countries and time can be explained by various features of old-age public pension systems (in particular the standard retirement age, and accrual rates) and income-support systems available (replacement rates in unemployment-related and special early-retirement schemes. Microeconometric analysis for five OECD countries (United States, Germany, Italy, United Kingdom and Netherlands) confirms the importance of pension incentives (such as pension replacement rates, pension

wealth or the option value) for retirement decisions, but also highlights the role of health status and various socio-economic variables.

I.3 Policy conclusions

8. The paper shows that changes in policy instruments can have a significant effect on the labour force participation of older workers. Judging from the estimated pooled cross-country time-series equations in Chapter V, removing disincentives to work for the 55-64 year-olds could increase their participation rates by 8-9 percentage points or more in countries with particularly large distortions in their current systems; in most of the other European countries the rise would be in the order of 4 to 6 percentage points, and in North America and Japan it would be below 4 percentage points. Such effects are also confirmed in simulations of microeconometric models: changes in key features of the pension system could raise the average age of retirement significantly.

9. Establishing a neutral retirement system is a demanding task. In most countries it involves changing both the old-age pension system and the various income-support programmes which can be used as *de facto* early-retirement schemes. In fact, tackling the latter is likely to be an essential ingredient of a successful pension reform, as the effectiveness of a neutral old-age pension system in itself will be undermined if other systems remain unduly distorting.

10. Removing or reducing disincentives to work in the old-age pension system could be done in various ways. Given that incentives are typically less distorting prior to the earliest age at which old-age pensions becomes available, a direct way to encourage people to work longer would be to raise the pensionable age. Provided that the various *de facto* early retirement programmes are reformed at the same time, this measure could be effective in raising the average retirement age. However, increasing the minimum pensionable age and closing down the option to access pensions prior to that age might involve an excessive degree of compulsion, denying the elderly with very strong preferences for leisure or facing difficulties in the labour market to retire early.

11. To combine neutrality with flexibility, the most appropriate reform would be to allow people to retire at the age of their own choice and to adjust the pension level so that the pension system is neutral on average. Under such a system, the increase in pensions due to an additional year of work would make up for an additional year of pension contributions and for delaying the receipt of pensions by one year, removing the incentives to retire early embedded in current arrangements. With such a neutral system, people could be given the opportunity to retire at the age of their own choice: those choosing to retire in their fifties could do so but at the cost of a permanently lower pension stream than if they worked longer, whereas those choosing to work until their late sixties or longer would be correspondingly rewarded.

12. These reforms could pose considerable challenge to OECD labour markets. The removal of disincentives to work would significantly increase the supply of older workers in the labour market, and it might be difficult to absorb this increase in countries with high structural unemployment. The adjustment would be eased if reforms of pensions and other income-support systems for the elderly were to be accompanied by measures to increase job opportunities in general, including elimination of measures and practices that discriminate against older workers. The reforms discussed above could themselves contribute to increase job opportunities for older workers by inducing *inter alia* changes in their wage determination, participation in training, mobility, and working-hour schedules. However, the more broad-based reforms of labour and product markets along the lines advocated in the OECD Jobs Study would make the transition to increased participation of older workers in the labour market both easier and quicker.

II. NON-EMPLOYMENT OF OLDER WORKERS: A BRIEF OVERVIEW

13. This chapter documents the weakening labour-force attachment of older workers in recent decades, and examines the characteristics of persons aged 55-64 who are already retired. Unless stated otherwise, retirement in this chapter is defined as complete withdrawal from work, as recorded in labour-force surveys. Alternative definitions, such as departures from prime-age employer or shifts towards shorter working hours, would inevitably result in different estimates of average retirement ages and paint a different picture of the characteristics of those retired before the age of 65.

II.1 Average retirement ages: Evolution since the early 1960s

14. There are striking differences in average retirement ages of workers across OECD countries (Table II.1). In the 1960s and early 1970s, males retired from the labour market after the age of 65 in almost all OECD countries. Since then, the average age of retirement has declined in all countries for which data are available; by 1995, a quarter of the countries listed in Table II.1 had an average retirement age below 60 for males. While historically lower than that for men, the average age of retirement of women has followed a similar pattern over the past three decades; in 1996, more than half of the OECD countries had an average age of retirement below 60 for women. It would make little difference to the estimated average retirement age if those aged 55-64 working less than 10 hours per week are considered to be retired (Table A.1); the intensity of such work arrangements differs greatly across countries (Tables A.2 and A.3).

15. The different age patterns of retirement across countries are illustrated in Figure II.1, which depicts the probability of entering into retirement at different ages conditional on working up to those ages[2]. In some countries, outflow probabilities are characterised by a single peak; in others there are two or more spikes. Countries with similar average retirement ages may exhibit very different patterns of labour-force exits. For example, Germany and Italy are estimated to have similar retirement ages for males; in the former case this is the result of low probability for those younger than 60 and high probability for those older than 60, whereas in the latter case the probability is comparatively high at younger ages and low at older ages.

16. The variation in retirement ages for males across countries and time are reflected in participation and employment rates of the 55-64 year olds (Figures II.2 and A.1). Thus, in the countries where the average retirement age for men is below 60, less than half of the male population aged 55-64 is participating in the labour force (around a third in Belgium and Luxembourg), and in the two countries with the highest average retirement ages, the participation rate of the 55-64 year olds is above 80 per cent. This compares with the 1960s and early 1970s, when activity rates for the age group were in the range

2. The probabilities are based on Kaplan-Meier estimators from Labour Force Survey (LFS) data. The conditional probability, or hazard function, at age j in the year t is calculated as the ratio between the number of individuals who have left employment to retirement during the period t-1 and t and with age j divided by the total number of individuals "at risk", i.e. employed at t_{-1} and with age j_{-1}.

between 70 and 85 per cent. The relationship between participation rates of females aged 55-64 and the average retirement age for women over time is different from that for men. The participation rate of women aged 55 to 64 has remained stable or even increased, while their average age of retirement has dropped. In other words, a larger proportion of women aged 55-64 are active but, on average, they retire earlier than in the 1960s.

II.2 The reason for non-employment of older workers: self-reporting survey evidence

17. There is no clear cross-country pattern as to the reasons why inactive males in the 55-64 year-old age group have left their last job. According to the 1995 European Union Labour Force Survey, in 6 of the 15 countries, more than half of inactive men in this group claimed that the reasons were due to early or normal retirement (Table II.2). However, in Sweden, Finland, the United Kingdom and Spain (the three first countries having experienced particularly deep recessions in the early 1990s) the reasons were somewhat different. In Finland and the United Kingdom the high rate of involuntary departures was equally split between dismissal or redundancy and disability or illness; in Spain the termination of fixed contracts also played an important role in addition to health and redundancy; whereas in Sweden the high rate was concentrated on dismissal or redundancy.

18. Displacement of older workers does seem to be associated with early retirement. In the United States, Germany, and the United Kingdom the share of older workers in displacement is disproportionate compared with prime-age workers (Table II.3), although the incidence is only slightly higher in all the countries. However, microeconometric estimates suggest that this is not because of age itself, but because older workers have characteristics (such as lower educational attainment and sectoral affiliation) which increases the risk of displacement (Antolin, forthcoming; Fallick, 1996; Farber, 1993). But once an older worker has been displaced, he or she is much more likely to drop out of the labour force than younger workers.

II.3 The characteristics of older non-employed workers: incidence analysis

19. In member states of the European Unions, the proportion of males aged 55-64 with only basic education is generally significantly higher among the early retired than among those in work, and the opposite holds for those with tertiary education (Table II.4). The difference in educational attainment of the retired and the employed in the 55-64 year age group is notably large in Austria, Italy and Luxembourg, while it is comparatively modest in the United Kingdom, Netherlands and Germany. As educational qualifications are often closely linked to earnings capacity and job stability, these tabulations suggest that lower earners and those with unstable jobs may have a greater propensity to retire early (see Chapter V).

20. The incidence of retirement before the age of 65 also differs systematically across sectoral affiliation. This is evident from special tabulations from the European Union Labour Force Survey for 1996 (although high non-response rates among those retired in the 55-64 year age group as to questions concerning previous sectoral affiliation warrants some caution). The ratio of retired persons aged 55-64 claiming to have last worked in a sector to persons aged 55-64 working in the same sector (Table II.5) suggests that the incidence is particularly high in the following activities:

- Manufacturing: the incidence was higher than the national average in all countries for which data are available. The incidence was more than twice the national average in Belgium, Italy and Luxembourg.

- Mining and quarrying: the incidence was much higher than the national average in 13 countries.

- Construction: the incidence was higher than the national average in all the countries except Germany. The incidence was particularly high in Finland and Spain.

- Transportation: only Spain had a lower incidence than the national average.

The following sectors were characterised by low incidence:

- Agriculture, forestry and fishing: only Germany had a higher incidence than the national average.

- Wholesale and retail trade: the incidence was lower than the national average in all the countries except in Finland and the Netherlands.

- Hotels and restaurants: only Denmark and the Netherlands had a significantly higher incidence than the national average.

- Real estate: the incidence was lower than the national average in all the 13 countries.

No clear cross-country pattern was detected for:

- Electricity, gas and water: the incidence is well above the national average in France, Greece and the United Kingdom, while it is well below the national average in Spain, Luxembourg and the Netherlands.

- Financial intermediation: the incidence is more than twice the national average in Ireland and Greece, whereas it is close to only half the national average in Luxembourg, Germany and Austria.

- Public administration: the early retirement incidence is relatively high in Greece, the United Kingdom and Ireland, and relatively low in Spain, Luxembourg and Germany.

These incidence patterns mirror to some extent sectoral employment trends: high incidence of early retirement in declining or slow-growing sectors and low incidence in fast-growing sectors. As discussed in OECD (1995*a*), older workers tend to be concentrated in declining or slow-growing sectors (see also Table A.4).

21. Self-employed persons are much less likely to be retired prior to 65 than employees in all countries for which data are available. As a result, the share of self-employed in the labour force aged 55-64 is significantly higher than for all ages (Table A.5). The self-employed make up a third or more of the male labour force aged 55-64 in 9 out of the 15 European countries listed in Table II.6, and in three of the countries (Greece, Ireland and Italy) close to a half or more of the elderly male labour force consists of self-employed. By contrast, the share of the self-employed in the retired population aged 55-64 is under a quarter in all the countries, and even below 5 per cent in two of them (Germany and Sweden).

II.4 Concluding remarks

22. The implications of ageing populations in the future on living standards will be closely related to the evolution of average retirement ages. The stabilisation or further reduction in average retirement ages will amplify the adverse consequences, whereas an increase in the average retirement age will moderate the problems related to ageing. Indeed, OECD estimates (not reported in the chapter) suggest that should the average age of retirement rise to 70 most of the adverse consequences on living standards could be avoided. However, this would require a dramatic change in labour-force participation of older people.

23. To the extent that the incidence of early retirement across different groups remains unchanged, compositional changes of the labour force in the future -- higher educational attainment, growing share of some service sectors, and growing importance of self-employment -- may raise the average retirement age somewhat. However, the incidence pattern in the future may differ significantly from that in the mid-1990s. Moreover, the different incidence of labour force attachment is likely to reflect different incentives at present facing different groups, and a detailed understanding of public-income support systems for the elderly is required in order to see to what extent the average retirement age may be increased in order to ease the future ageing problem; this is pursued in the coming chapters.

III. OLD-AGE PENSION SYSTEMS: INCENTIVES FOR EARLY RETIREMENT?

24. All OECD countries have established systems to support people in their old age. Typically people contribute to such schemes during their working life in exchange for income support after a certain age and/or benefits to surviving dependents. The age of entitlement to old-age pensions, the pension replacement rate and accrual profile, and contribution rates influence the time at which people retire. This chapter reviews the incentives embedded in public old-age pension systems, how they have evolved since the early 1960s and how recent reforms have affected the incentives to work for older people. Voluntary occupational pensions are not covered in this chapter, although there is growing evidence that such schemes play a major role in determining the age of retirement in several countries[3].

III.1 Coverage and institutional arrangements

25. Entitlements to old-age pensions are universal in most OECD countries, due to mandatory coverage for employees and self-employed alike. Coverage has expanded in recent decades as previously excluded groups, notably the self-employed, have become entitled to state pensions. Even in Germany, where coverage for the self-employed is still voluntary, the overall coverage rate has increased from 77 per cent in 1970 to 90 per cent in 1995, as more and more self-employed have joined the state system[4]. The only major group excluded from the state pension system in many OECD countries at present is employees and self-employed with very low earnings. In Turkey, Mexico and Korea large groups are still outside the state pension system, but mandatory coverage is in the process of being expanded in all countries.

26. Several OECD countries combine basic state pensions with obligatory occupational pensions, the latter being run either by the government or by private institutions subject to statutory regulations. Mandatory occupational pensions are typically of the defined-benefit kind, i.e. benefits are not directly related to previous contributions but determined according to some fixed rules. Such systems are operated *inter alia* in Japan, France, Greece, Sweden, Finland and the United Kingdom. A few countries have established mandatory defined-contribution systems, where benefits are directly linked to past contributions to pension funds and returns on their investments. This is a long-established practice in Denmark; in France it was made mandatory in 1972; in Switzerland it started in 1985, in Australia it has spread since 1987[5], and Mexico has recently established such a system[6].

27. While a few countries have universal pension systems so that all employed people are faced with the same pension rules, most countries have fragmented pension systems so that rules may differ

3. For the United States, see e.g. Kotlikoff and Wise (1987, 1989), and Lumsdaine, Stock and Wise (1994). For the United Kingdom, see Miniaci and Stancanelli (1998).

4. See Börsch-Supan and Schnabel (1997).

5. See chapter on Australia in OECD (1995*b*) and Bacon and Gallagher (1995).

6. See OECD (1996).

according to sectoral affiliation and profession. For example, public employees are subject to special pension rules in 14 out of the 29 OECD countries, and the self-employed and farmers have their own systems in several countries (Table A.6). In some countries (such as Japan) the self-employed are entitled to a basic state pension, but are not entitled to (and do not contribute to) mandatory earnings-related pensions. The discussion below will concentrate on the system covering the largest number of persons, but special schemes will be discussed where appropriate.

III.2 Basic features of old-age pension systems

28. A pension system can be described according to certain basic features. This section discusses these basic features under four separate headings: the standard entitlement age; the pension replacement rate; the pension accrual rate; and actuarial adjustment to pensions and long-serving pensions.

III.2.1 The standard age of entitlement

29. The standard age of entitlement to public pensions differs considerably across OECD countries (Table III.1). At present, it is 65 for males in more than half of all the countries. However, it ranges from a low of 60 in a few countries (Japan (employee pension only), France, Italy) to a high of 67 in some Nordic countries (Denmark, Iceland and Norway). The standard entitlement age is often lower for females. The majority of OECD countries have kept the standard age unchanged since the early 1960s: only 7 countries have lowered the age of entitlement. More recently, a few countries have increased the standard age in general (Italy and New Zealand) or for females in particular (Japan). As discussed later in this chapter, several countries have already decided to raise the standard pension age gradually in the future.

30. In countries with fragmented public pension systems, the standard entitlement age may differ across sectors and professions. Groups with a lower standard age of entitlement often include government employees (e.g. Finland, Portugal and Greece), miners and some other groups in occupations regarded as arduous (e.g. Germany and France). On the other hand, the self-employed have a higher standard entitlement age in some countries (e.g. in Japan it is 65 compared with 60 for employees, and the age for mandatory occupational pension for some self-employed groups in France is as high as 68). This pattern could to some extent explain the different incidence of retirement across the various groups discussed in the previous chapter. A few countries (Portugal and Greece) are in the process of aligning the standard entitlement age for public employees with that in the private sector.

31. The impact of the standard entitlement age depends in part on the disincentives to continuous work embedded in the pension system. Means testing of pension benefits after the standard age may depress the labour supply of older workers. Eleven of the OECD countries listed in Table III.2 have some form of means testing of old-age pensions, but the disincentives to work differ depending on the level of the earnings disregard, i.e. the amount of earnings allowed before pensions start being reduced, and benefit reduction rates. As the countries allow some earned income before pensions start being cut, the potential labour supply impact is likely to be concentrated on hours supplied rather than complete withdrawal from the labour market[7]. Nonetheless, when the earnings disregard is low and the benefit

7. Seike (1989) shows that the earnings test in the Japanese employee pension systems affected hours of work supplied by older workers.

reduction rate is high or when it is difficult for older workers to choose their working hours, means testing may have particularly strong depressing effects on labour force participation[8].

32. Direct restrictions on work beyond the standard age would also result in an abrupt decline in labour force participation. However, only a few countries (Portugal and Spain) make entitlements to old age pensions beyond the standard age conditional on complete withdrawal from work[9]. But even in countries where there are no direct restrictions on work or no means testing of benefits, access to pensions is often conditional on leaving the current job[10] and, given the difficulties for older workers to find a new job, this practice amounts to a *de facto* restriction on combining work with pension receipt. Moreover, some countries (e.g. Italy) take away statutory protection for workers older than the standard entitlement age.

33. The spike in labour market outflows at standard entitlement ages (Figures II.1) demonstrates that the standard age exerts some influence on retirement decisions. A few of the countries depicted in the figures exhibit a single peak at the standard entitlement age (e.g. the United Kingdom, Portugal and Ireland), and the increase in the standard female entitlement age in Portugal in the 1990s can be detected in the shift in the hazard function. However, several countries have high outflow probabilities prior to the standard retirement age, the hazard even peaking before the standard age in some (Austria, Finland, Germany, Luxembourg).

III.2.2 The pension replacement rate

34. The pension replacement rate will tend to influence the decision to retire. For workers who have reached pensionable age, retirement is more likely if the pension replacement rate is high, both because they are better able to maintain their living standards and because the opportunity cost of continuing working is high (see below). But changes in pension replacement rates may also affect retirement decisions of workers below the standard retirement age. An increase in pension replacement rates without a commensurate increase in contribution rates will increase the social security wealth of participants. This increase in wealth can result in higher consumption, increased leisure, or a combination of both[11]. To the extent that the increase in wealth is widely anticipated, increased generosity may induce future beneficiaries to mainly adjust their saving behaviour. However, if the increase is unanticipated and older workers have already saved for retirement on the basis of the lower replacement rate, they may use their new found wealth to finance early retirement rather than increase their consumption in a major way.

35. There is no such thing as a single pension replacement rate in any national retirement scheme. Even where old-age pensions are a set amount, the gross replacement rate will differ according to previous earnings and household composition or other household income. Gross and net replacement rates differ according to the tax treatment of pensions and the progressivity of the tax system. In earnings-related pension systems the calculation of the pension level will be much more complicated, depending *inter alia* on the length of the time period, and the earning profiles over this period, used as a reference for determining the pension level, the indexation mechanisms used to revalue past earnings for pension

8. In the case of Austria, it is claimed that it has encouraged older people to work in the informal sector (Walterskirchen, 1991).

9. This practice was more common earlier. For example, retirement was necessary in Belgium in the 1960s.

10. See e.g. Blanchet and Pelé (1997).

11. See e.g. Boskin and Hurd (1978) and Burtless (1986).

purposes and to adjust initial pensions to changes in wages or prices. Constructing a synthetic indicator across countries and time that would take all these factors into account has not been attempted. However, Table III.3 reports gross pension replacement rates (i.e. before taxes on earned income and benefits are taken into account) that a 55 year-old worker could expect to get at the standard retirement age if he were to continue working until then, based on the simplifying assumption listed in Box III.1.

Box III.1 **Old-age pension replacement rates: Construction and main assumptions**

The replacement rates reported in Table III.3 are averages of four cases: two earnings levels (i.e. average and two-thirds of average) and two household compositions (i.e. a single worker and a worker with a dependent spouse). For all cases it is assumed that the employee starts work at the age of 20 and that he has uninterrupted work until the standard age of entitlement to public pensions. The earnings profile over the working life is assumed to be flat and earnings revalued in line with changes in average earnings. The expected replacement rate at 55 is computed using pension rules prevailing at that age or announced changes in rules up to the standard entitlement age. The reported rates cover basic pensions, means-tested supplements and mandatory occupational pensions only.

The calculated pension rate will reflect:

-- flat levels of pensions in flat-rate regimes and/or flat supplements for dependants in earnings-related regimes (ERR);
-- the profile of the pension accrual factor and the length of contribution periods in ERR;
-- maximum and minimum levels of pensions in ERR.

The main shortcomings of the synthetic indicator include:

-- full indexation of earnings for benefit calculation[1], so that the pension replacement rate is overstated when earnings for pension purposes do not rise in line with the general earnings (e.g. when indexed on the CPI or not indexed at all);
-- flat real earnings over the reference period used to calculate earnings-related pensions, so that the pension level is overstated i) when the general level of real earnings is rising, ii) when older workers change jobs which is often accompanied by cuts in earnings, and iii) when the reference period is very long, so that it includes early career years with typically below-average earnings[2].
-- the tax treatment of benefits is not taken into account: in countries where old-age pensions are largely untaxed (e.g. Germany) the net replacement rate is significantly higher than the gross rate.

Because of these assumptions, the change in the synthetic indicator does not reflect changes in the earnings base used to determining pensions or alterations in the tax treatment of earnings and benefits.

The main source for pension rules is *Social Security Programs Around the World*, published every two years (every three years prior to 1967) by the U.S. Department of Health and Human Services. Supplementary information has been obtained from publications from the Commission of the European Communities and the Council of Europe, and from national sources. The average earnings data used in the calculations come from the OECD Database on Unemployment Benefits[3].

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1. Exceptions were made for the United States prior to 1977 and Japan prior to 1975.
2. While rising or concave age-earnings profiles can have major effects on the pension level measured relative to earnings just prior to retirement, the impact on replacement rates is much less marked when pensions are measured relative to average annual earnings over a longer period.
3. These do not coincide with figures on earnings reported in OECD publications on *Tax/benefit Position of Production Workers.*

36. According to Table III.3, expected replacement ratios differ considerably across OECD countries[12]. At one extreme are countries where pensions can be expected to be close to the pre-retirement earnings level (Italy, Luxembourg, Iceland, Portugal, Sweden and Austria), or even to match or exceed earnings from work (Spain and Greece). At the other extreme are countries (Australia and Ireland) where only about 40 per cent of gross earnings can be expected to be replaced by public old-age pensions. However, for the majority of the countries the synthetic indicator for expected old-age replacement rates was in the range of 47 to 67 per cent.

37. There has been a clear tendency for expected pension replacement rates to rise over time. The unweighted average for the countries for which data are available from 1960 onwards rose by 15 percentage points between 1961 and 1995, with most of the increase taking place in the 15 years to 1975. However, these broad trends mask considerable differences across countries. In some (Austria, Belgium, France, Ireland, Portugal and Germany) the replacement rate remained broadly stable or even fell[13], whereas in some others (Japan, Canada, Australia, New Zealand, Denmark, Finland, Norway, and Switzerland) it rose by 20 percentage points or more.

38. The structure of replacement rates would also seem to be in line with the findings from Chapter II that early retirement tends to be concentrated on low-income groups. The existence of flat pension components, maximum and/or minimum pensions implies that replacement rates in some countries are higher for those on low earnings than those on high earnings in many countries (Figure III.1), and this pattern of replacement rates might partly explain why early retirement is concentrated among those with low earnings capacity. However, the fact that this incidence pattern is present in countries where the replacement rates are similar across earning ranges shows that other factors play a role as well.

39. In some countries, replacement rates are also lower for the self-employed. For example, the self-employed in Japan are only entitled to basic old-age pensions and not to mandatory earnings-related pensions, which implies that the replacement rate for a single person with average earnings was only 17 per cent for the self-employed compared with 44 per cent for employees in 1995. The replacement rate for self-employed in general, and farmers in particular, is also much lower than for employees in some European countries (e.g. Belgium, Germany, Greece)[14]. This is in line with findings in the previous chapter that the self-employed tend to work longer than employees.

III.2.3 The pension accrual rate

40. Retirement decisions of older workers should be sensitive to the gains in old-age pensions from working for an additional period. Thus, if the pension accrual rate is zero there are no penalties in terms

12. Eurostat (1995) provides cross-country comparable data on gross replacement rates for some of the EU countries.

13. However, in the case of Germany, the fall in the gross replacement rate was accompanied by a rise in the net replacement rate, see Börsch-Supan and Schnabel (1997).

14. There is only patchy information about pension levels for the self-employed and farmers. However, according to information in Eurostat (1992), the replacement rates for the self-employed in Belgium in 1988 were 0.22 and 0.27 for singles and couples respectively (0.60 and 0.75 for employees). The maximum replacement rates for farmers in Germany in 1990 were 0.17 and 0.25 for singles and couples respectively (0.5 for employees retiring at 65); the figures for Greece in 1991 were only 0.05 and 0.11.

of lower old-age pensions from withdrawing from the labour market. However, if the accrual rate is high there are incentives for workers to continue working and thus enjoy higher pensions after retirement.

41. Pension accrual rates differ significantly across OECD countries. On one extreme of the spectrum are countries (e.g. Australia) where pensions are not related to employment/contribution records but on length of residence, in which case the accrual rate with respect to employment is zero. At the other extreme are countries (e.g. Germany) where the level of pensions increases over the whole of the potential working life (Figure III.2). In between are countries where full pensions are earned relatively quickly, implying zero pension accrual rates for older workers. In fact, in almost half of the countries for which data are available for 1995, a 55 year-old male worker could expect no or an insignificant increase in his pension by working for 10 additional years (Table III.4). Even in countries which offered gains in pensions from continued work, the increase in the pension replacement rate was generally 15 percentage points or less.

42. The low accrual rates in the 1990s contrast sharply with those in the 1960s. For example, in 1967, ten additional working years from the age of 55 could increase the pension replacement rate by a third in Belgium, and by a fourth in France. The main reason for such high accrual rates for older workers in the 1960s was the introduction of contribution-related pensions and special transitory arrangements which allowed full pensions to be acquired in a few years. In the case of France, high accrual rates (until 1980) were due to a policy of having age-specific accrual rates for workers in their 60s, each additional year increasing the pension replacement rate by 5 percentage points (i.e. pension replacement rate at 60 of 25 per cent while at 70 of 75 per cent) in the 1970s.

43. The incentives embedded in high pension accrual rates have been weakened in some countries by crediting some form of inactivity over working-age years as equivalent to covered employment[15]. For example, special early retirement schemes (see below) typically involve continued contributions for old age pensions; disability benefit recipients do not experience any drop in their old-age pensions due to their non-employment status; and in some countries (e.g. Germany) unemployment confers entitlement to pensions in the same way as employment.

III.2.4 Actuarial adjustment to pensions and long-serving pensions

44. While maintaining a standard age of entitlement in their pension systems, a few countries allow older workers some flexibility in accessing their pension with some adjustment in the value of the retirement income (Table III.5). The United States, Japan (National pension system), Canada, Sweden and Finland offer such flexibility on both sides of the standard entitlement age, whereas Greece and Spain have this possibility only available for early withdrawal, and Germany, the United Kingdom, the Czech Republic and Hungary have it only for deferred withdrawal. The earliest age at which pensions can be accessed is typically 60 and the adjustment to pensions last at maximum to 70. The most common adjustment to pensions is 0.5 per cent per month of early or deferred withdrawal. The adjustment factor is significantly higher in Japan, and in Finland and Sweden after the standard retirement age has been reached.

45. A few European countries allow people to access pensions before the standard retirement age provided that they have contributed for a sufficient number of years. The contribution period required for

15. See Ministerie van Sociale Zaken (1997).

such early withdrawal is 35 years in the four countries where this possibility exists[16]. However, the earliest age at which such withdrawal is permitted varies considerably across the countries in 1995: in Italy it was already an option at the age of 52, in Greece it was 58, in Austria it was 60 and in Germany it was 63. None of these countries had long-serving pensions in 1960. Austria was the first country to introduce such pensions in 1961, in Italy it was introduced in 1969, whereas in Germany it was one of the critical elements of the 1972 pension law.

46. A common feature of those national systems that allow for early withdrawal of pensions is that access is conditional on retirement from work, at least until the standard retirement age has been reached. This is either because of direct restrictions on working in covered employment (e.g. Finland) or because of earnings tests which *de facto* make work impossible (e.g. in Germany earnings are not allowed to exceed 15 per cent of average earnings). This practice is likely to encourage permanent withdrawal from the labour market even in countries with no earnings test after the standard retirement age, as re-entry is likely to be difficult.

47. In some of the countries which allow early withdrawal of old-age pensions, the earliest age at which such benefits can be paid coincides with spikes in the probability of retiring (see Figure II.1). Thus, spikes occur at the age of 62 for men in the United States, 63 in Germany, and 60 in both Austria and Spain. For these countries, the early-withdrawal option seems to have encouraged retirement.

III.3 Old-age pension wealth

48. The pension variables discussed in the previous section can be summarised as old-age pension wealth, i.e. the discounted value of expected old-age benefits minus the discounted cost of obtaining such benefits[17]. In addition to the discount factor, the present value of old-age pensions (relative to earnings) depends on the age at which pensions become available, the gross pension replacement rate and life expectancy (as this determines how long benefits will last) or the survival probabilities at different ages. The cost to the individual is the contribution he or she pays to the pension part of social security in contribution-based system[18]; in systems where pensions are paid out of general tax revenues this direct cost is zero.

49. Old-age pension wealth of an individual at a given age (e.g. 55) will depend on the age at which he or she retires. Prior to the age at which pensions become available, working for an additional year may eventually increase the pension replacement rate (depending on the accrual profiles) but at the cost of one year of pension contributions. After the earliest age at which pensions can be accessed, working for an

16. Belgium has allowed early access to old-age pensions before the standard age since 1990 without any minimum contribution period, but a reform in 1997 stipulated that the minimum period should be 20 years rising to 35 by 2005.

17. This framework was introduced by Burkhauser (1980). It has been used extensively in the NBER international project on retirement (see Gruber and Wise, 1997). The 11 country monographs from this project include: the United States (Diamond and Gruber, 1997), Japan (Oshio and Yashiro, 1997), Germany (Börsch-Supan and Schnabel, 1997), France (Blanchet and Pelé, 1997), Italy (Brugavini, 1997), United Kingdom (Blundell and Johnson, 1997), Canada (Gruber, 1997), Belgium (Pestieau and Stijns, 1997), Netherlands (Kapteyn and de Vos, 1997), Spain (Boldrin, Jiminez and Peracchi, 1997), and Sweden (Palme and Svenson, 1997).

18. If employees do not regard employers' contributions as a tax that they pay through lower wages, such contributions would have no effects on the retirement decision.

extra year implies foregoing one year of pensions (provided that pensions are not paid out if work continues) and often paying contributions for an additional year, but may result in higher pensions. When the increase in pension benefits is exactly offset by the higher cost in terms of contributions and foregone pensions at all ages, the pension system is not distorting the retirement decision. However, if the old-age pension wealth diminishes with the postponement of retirement, there is a clear incentive to retire early, as the drop in pension wealth acts as an implicit tax on income from continued work. By contrast, if pension wealth increases with continued work, there is an implicit subsidy.

III.3.1 Estimates of old-age pension wealth: past and present

50. Judging by the estimated change in old-age pension wealth relative to annual earnings for a single person aged 55 in 1995 (Figure III.3 and Box III.2), old-age pension systems in all OECD countries discouraged work at virtually all ages from 55 to 70[19]. The drop in pension wealth was particularly marked after the earliest age at which pensions could be accessed: the delay in pension receipt for one year and one year more of contributions was not offset by the actuarial increase in pensions where that was possible. This implicit tax was very high in countries with high replacement rates. Prior to the standard age of entitlement, pension wealth was unchanged in Australia and New Zealand, whereas all other countries depicted in Figure III.3 had lower pension wealth at the age of retirement than at the age of 55. This drop was insignificant in the case of Denmark (where pensions are mostly financed by general tax revenues) and Switzerland, but amounted to more than one year of earnings in a number of countries. In countries where it is possible to get early access to benefits at a reduced rate, the actuarial reduction was not high enough to eliminate the discouragement to continued work.

51. As could be expected from the discussion in the preceding section, the drop in pension wealth from continued work after 55 has steepened significantly in recent decades (Table III.6). Indeed, in 1967 pension systems in several countries were close to being neutral with respect to the retirement decision over ages 55 to 64, and a few countries encouraged work over this age span by increasing pension wealth with continued work. The broad trend towards stronger incentives in the old-age pension system to retire early masks considerable differences across countries. Increased incentives to retire early have been particularly strong in Italy, Belgium, Finland and Sweden, whereas the pension wealth accrual relative to earnings remained virtually unchanged in the United Kingdom, Australia and Portugal.

19. This is broadly in line with the findings of the NBER country studies listed in footenote 17. These studies calculated the social-security wealth accrual and implicit tax rates for several cases (single earner, earner with a dependent spouse; median, 10th and 90th percentile earnings; and, incomplete earnings histories) for one point in time. In contrast to this study, the NBER papers use earnings histories to calculate pensions and adjust pensions for taxes before deriving social security wealth accruals. Where appropriate, the NBER studies take into account the possibility of obtaining early-retirement benefits via unemployment or disability programmes. As discussed in Chapter IV, the availability of such benefits increases the disincentives to continue work at older ages.

Box III.2 Estimates of old-age pension wealth

The pension wealth accrual profiles depicted in Figure III.3 are calculated on the basis that the individual started work at the age of 20 and has thus 35 years of contributions behind him at the age of 55. At the age of 55 the expected old-age pension wealth relative to earnings (PW) for different potential retirement ages (a) is computed as

$$PW(55,a) = \sum_{i=a}^{d}\left(PRR_i \cdot (1+\tau)^{-(i-55)}\right) - \sum_{i=55}^{a-1}\left(CR_i \cdot (1+\tau)^{-(i-55)}\right)$$

and the wealth accrual depicted in Figure III.3 is defined as

$$DPW(55,a) = PW(55,a+1) - PW(55,a)$$

where PRR is the pension replacement rate, CR is the contribution rate, d is the expected age of death for a 55-year old male and τ is the discount rate. When the retirement age is lower than the earliest age at which pensions become available, PRR takes a value of zero until the pensionable age. The earliest age at which pensions become available are either the standard retirement age, or the earliest age at which long-serving pensions or actuarially-reduced pensions are paid out. (The impact of special early-retirement schemes, unemployment-related benefits and disability programmes on social-security wealth is discussed in Chapter IV.)

The following assumptions are made for the calculations:

- the individual has 35 years of work behind him at the age of 55, and has contributed to pensions as long as such arrangements have existed or been mandatory (in case of occupational pensions);
- the discount rate is set at 3 per cent for all countries and all periods, even if empirical estimates suggest that it may be much higher;
- receipt of old-age pensions cannot be combined with continued full-time work, as it is generally a condition for access to pensions to either terminate work altogether or with the current employer; earnings disregards and benefit reduction rates are also such that pensions would be low for someone on average earnings, and;
- the contribution rate is the sum of employees and employers contribution to pensions, as the employees are assumed to bear the cost of employers contributions.

Sensitivity analysis carried out by the Secretariat suggests that the results would not change qualitatively with different discount rates.

III.3.2 Recent pension reforms: Impact on incentives to work

52. Several OECD countries are in the process of phasing in changes to their pension systems or have decided major changes though not yet started the implementation phase. While the motivation for these changes has been cost containment and financial balance in the face of ageing populations, the adjustments have had (or will have) major effects on work incentives embedded in pension systems. The reforms have usually implied changes to several of the basic parameters determining pensions and to contribution rates. An important component of pension reforms in a number of countries has been the lengthening of the reference period used in determining the value of pensions (e.g. France, Spain and Sweden) or the length of the contribution history required for early access (Belgium), and changes in the indexation of pensions to net wages (e.g. Germany and Japan) or prices (e.g. France) instead of gross earnings. Several countries have also increased the standard age of entitlement (e.g. the United States, Japan, Italy and New Zealand), altered the pension accrual rate and/or the value of pensions (e.g. France and the United Kingdom), and given people greater choice to determine at what age they could access benefits (e.g. Germany).

53. The impact of these latter changes on retirement incentives can be assessed with the help of estimated pension wealth accruals. The panels in Figure III.4 depicts wealth accruals for a few OECD

countries before and after their pension reforms have been fully implemented. The reforms and their impact for each country are as follows:

- *United States*. The 1983 reform, which will be fully implemented in 2022, included the raising of the standard entitlement age to public pensions from 65 to 67. Moreover, the actuarial adjustment factor for each year of work beyond the standard age has been increased from 3 to 8 per cent, while the pension system will still allow access to pension at 62 but with an adjustment factor of 6 2/3 per cent for each year retirement taken from the age of 64 onwards plus 5 per cent for each year of retirement taken at 62 and 63. These reforms implied that the implicit tax on continued work was broadly unchanged for ages 62 to 64 but fell notably for ages 65 to 69.

- *Japan*. The 1994 reform, which will be fully implemented in 2025, raised the standard eligibility age for the basic component of pension payments from 60 to 65 for employees, access at the age of 60 still being possible but with an actuarial adjustment yet to be decided. Moreover, it is envisaged that the level of contribution rates be raised incrementally until the long-run stability of the system is achieved: this, however, would imply an increase from 14.5 per cent in 1995 to around 30 per cent according to official projections. On the assumption that the actuarial adjustment factor will be similar to that currently applied for the self-employed, the reform will reduce disincentives to work for ages 60 to 64, but the increase in pension contributions implies that the implicit tax increases significantly prior to the current retirement age of 60.

- *Germany*[20]. Reforms in 1992 and later, which will be fully effective after the year 2004, introduced an actuarial reduction applicable to seniority pensions from the age of 63 (for males) and actuarial increases for deferred retirement. The adjustment factors are 3.6 per cent per year of early retirement in addition to reductions due to fewer contribution years; and 6 per cent for each year of retirement after 65, in addition to increases due to a longer contribution history. Moreover, old-age pensions available to some categories of workers at the age of 60 (including unemployment pensions) will also be subject to actuarial reduction. This reform reduces the implicit tax on continued work for ages 60 to 64 and 67 to 69, but the system will continue to discourage work after the age of 55.

- *France*. The 1993 reform, which will be fully effective in the year 2008, included an increase in the contribution period for full pension from 37.5 to 40 years. For an employee who has contributed since the age of 20, this reform gives strong incentives to work until the age of 59 whereas there is an implicit tax on working from 57 to 59 in the current system. However, as it is still an option to retire via the ordinary unemployment benefit system and special early-retirement schemes, the implicit tax is unchanged when these possibilities are taken into account.

- *Italy*. The 1992, 1995 and 1997 reforms will significantly change the public pension system: i) the standard retirement age will be gradually raised to 65 for men and 60 for women (by 2002); ii) the earliest age for seniority pension will be gradually raised (54 currently) and this type of pension will be abolished in the year 2013; and iii) pensions will be gradually

20. The calculation reported for the current system in Figure III.4 includes the possibility of accessing old-age pensions at the age of 60 because of long-term unemployment and/or occupational disability (see Chapter IV and Antolin and Scarpetta, 1998).

determined by contributions over the entire working life. These reforms, when fully implemented in 2035, imply that the pension system will be fully contribution based and broadly neutral.

– *United Kingdom*. The 1986 reform, which will become fully effective in 2028, reduced the annual accrual rate in the State Earnings Related Pension Scheme (SERPS) from 1.25 to 0.41 per cent. However, the original intention with the SERPS was that maximum replacement rate should be 25 per cent, implying that accrual rates after 20 years of contributions would be zero. The reform thus increased the pension wealth accrual after 20 years of contributions, but disincentives still remain.

Several of the smaller OECD countries have made changes to their pension system to encourage the elderly to work. For example, Finland has introduced an age-specific pension accrual rate for those continuing to work between 60 and 70 (2.5 per cent increase in pensions for each year compared to 1.5 at younger ages), although it would not affect persons with a long work history because of a ceiling on the pension replacement rate attained before the age of 60. As discussed earlier, a few countries (e.g. Austria) with special systems for civil servants are aligning conditions in these schemes to that of the standard system.

54. Notwithstanding these reforms, traditional pay-as-you-go systems will still impose a significant tax on continued work at older ages in most countries. For example, in the United States the average implicit tax rate on work from 55 to 69 will have fallen only from 18 to 14 per cent once the reforms are fully implemented; in Japan the average tax rate will be unchanged as the reduction for ages 60-64 is offset by higher taxes on work from ages 55 to 59; in Germany the rate will drop from 38 to 28 per cent when there is a possibility of accessing pensions at the age of 60; in France it is practically unchanged when it is taken into account that early retirement can still take place via unemployment benefit and special early retirement systems, and in the United Kingdom the reforms have taken the average implicit tax rate down only from 16 to 13 per cent. Thus, removing the tax on continued work requires much more drastic changes to pay-as-you-go systems than have been decided so far.

55. More fundamental changes to public pension systems have involved strengthening the link between life-time contributions and pension benefits. Arrangements where contributions are fully reflected in pension benefits in an actuarially neutral way do not distort the work-retirement decision insofar as each additional year of contributions will be compensated by greater pension benefits upon retirement. The link between lifetime contributions and benefits has been reinforced in a number of OECD countries, including Italy (see above), Hungary, Mexico, Poland and Sweden, by shifting from a defined-benefit to defined-contribution systems. Since the latter transfer the risk of low-income upon retirement to individuals, these reforms have generally been accompanied by the introduction of means-tested benefits for those who do not otherwise qualify for a pension or whose pension falls below some poverty threshold. Moreover, workers who have already contributed to defined-benefit schemes for a long period are generally exempted from the reform or are offered the option to choose between the old and the new system. The move towards contribution-based schemes has also been accompanied by greater flexibility in the retirement decision. After the minimum retirement age (57 in Italy, 62 in Hungary and Poland), workers will be allowed to withdraw from the labour market at the age of their own choice: those retiring early will do that at the expenses of a permanently lower pension, while those retiring later will be correspondingly rewarded.

56. Different approaches have been used to move towards a contribution-based pension system. Some countries, including Hungary, Poland and Sweden, have shifted from a defined-benefit pay-as-you-go system to a mixed public-private system which includes a pay-as-you-go tier and a

privately-managed fully-funded compulsory tier. Mandatory contributions finance the two pillars in different proportions depending on the country. Moreover, in some cases, favourable tax treatment will encourage workers to contribute to an optional fully-funded third tier. The pay-as-you-go first pillar is generally based on the principle of Notional Defined Capital in which retirement benefits will be closely linked to the appropriately indexed virtual capital accumulated by each individual during working life. The second pillar operates as a fully-funded capitalisation system. Individual pension accounts are managed by private funds under government supervision and, upon retirement, workers will buy an annuity with the accumulated contributions.

57. Other countries have moved in to funded pension systems without introducing a two-tier mandatory scheme. Thus, Mexico has transformed the previous pay-as-you-go system into a fully-funded capitalisation system in which mandatory contributions finance individual pension accounts managed by private fund administrators. In contrast, the pay-as-you-go system will be maintained in Italy, but pension benefits will be gradually determined by the Notional Defined Capital, the contributions being capitalised at the rate of real GDP growth. The stock of contributions can be transformed into annual pensions from the age of 57 onwards, with adjustments reflecting life expectancy and expected GDP growth rates.

III.4 Concluding remarks

58. Future reforms directed at increasing participation rates of older workers will have to reduce the disincentives embedded in current or prospective old-age pension systems. Given that incentives are typically less distorting prior to the earliest age at which old-age pension become available, a crude way to encourage labour-force participation of the elderly would be to raise the pensionable age. However, as discussed in the next chapter, there are several schemes that can serve as *de facto* retirement systems. Unless these are reformed at the same time as the age of entitlement to old-age pensions is raised, the latter may not be very effective. The most promising reform to the old-age pension scheme would be to adjust the pension accrual rate so as to make the system neutral with respect to retirement decisions.

59. This route would also offer the possibility of flexible retirement ages. Thus, those who value leisure highly could be given the opportunity to access pensions, subject to an actuarially neutral reduction, at an early age. Similarly, those who put a relatively small value on leisure could postpone their retirement, and ultimately receive higher, i.e. subject to actuarially neutral adjustment, pensions.

IV. NON-EMPLOYMENT BENEFIT SYSTEMS: INCENTIVES FOR EARLY RETIREMENT?

60. Even where public pension systems discourage work at older ages, a lack of liquid assets may force employees to continue working to sustain living standards up to the age at which pensions can be drawn. Indeed, the sparse literature on liquid asset holdings by age suggests that a sizeable part of the population at older working ages has little savings to draw on in retirement[21]. It would thus not be an option for most persons to retire early, unless the authorities step in with benefits to non-working persons prior to the pensionable age. Such benefits can take different forms: disability benefits, unemployment-related benefits (including unemployment pensions), and special early retirement benefits.

IV.1 Financial support to early retirement: a brief overview

61. There are no comprehensive data available on how those retiring before the standard entitlement age support themselves. Labour force surveys provide some indirect evidence (such as those reported in Table II.2), but are often difficult to interpret. Administrative data on the age composition of those receiving various forms of income support provide some information about the source of income for those retiring early, and such data are reported below. There are, however, several problems with using such data. Firstly, some beneficiaries may receive benefits and work at the same time, so the number of recipients overstates the use of such benefits as early-retirement benefits. This is notably the case with disability benefits, where several countries provide partial benefits in line with reduced capacity to work. Secondly, some recipients may have two or more different benefits[22], so that adding up over recipients of different benefit schemes overstates the number of beneficiaries.

62. Bearing these points in mind, Table IV.1 shows that the elderly use disability benefits more than other non-employment benefits in almost all countries for which data are available. In a few countries (United States, Canada, Ireland) the number of disability beneficiaries aged 55-64 amounts to less than one-tenth of the age cohort. However, more than a third of the population aged 55-64 is in receipt of such benefits in Norway and Finland, and more than half in Austria.

63. The use of other sources of income support of the early retired differs significantly across countries, depending *inter alia* on the institutional set-up. Unemployment pensions are used in a few European countries. They are used in Germany, Denmark and Finland, but are only of marginal

21. For example, the median level of all personal financial assets of families in the United States with heads of households aged 55 to 64 was equal to only around 50 per cent of annual average earnings in 1991 (Poterba, Venti and Wise, 1996), and financial wealth of households in their mid-50s in the Netherlands in 1989 also amounted to 50 per cent of annual earnings (Alessie, Lusardi and Aldershof, 1997). A significant proportion of families in this age group have no financial assets at all, low wealth being concentrated on families with low educational attainment (Browning and Lusardi, 1996). As discussed in Chapter II, low educational attainment is also associated with early retirement.

22. See e.g. the discussion about Italy in Miniaci (1998).

importance in Austria. The standard unemployment benefit scheme appears to be used extensively in a few European countries, including France and the Netherlands. Special early retirement schemes outside the standard old-age pension system are currently not much used in OECD countries, with the exception of Denmark, Belgium and the Netherlands (where they are private).

IV.2 Replacement rates and benefit periods in non-employment schemes

64. The generosity of non-employment benefits depends on both the share of earnings that they replace and for how long persons are entitled to such benefits from the age of 55 to the standard age of entitlement to public pensions. High replacement rates may not act as a serious disincentive to work if the elderly can only access the benefits close to the standard retirement age, while moderate replacement rates may have strong effects if benefits are available at a relatively young age. The summary generosity indicators presented in Table IV.2 attempt to reflect both replacement rates and available benefit periods by calculating average annual replacement rates over the 55 to 64 year age span[23] (see Box IV.1).

Box IV.1 **Generosity indicators in non-employment schemes: Construction and main assumptions**

The generosity indicators reported in Table IV.2 are averages of six cases: two earnings levels (i.e. average and two-thirds of average) and three household compositions (i.e. single, dependent spouse and a working spouse). For each case, replacement rates are calculated for each year in the 55-64 year age range, and the annual average derived. This implies that schemes that become available only at a relatively late stage in this period take a low value as the annual replacement rate is zero until benefits can be accessed. It also means that schemes with short duration (such as unemployment benefits in some countries) will take on a low value.

The main assumption behind the calculations are the same as for the calculation of the old-age pension replacement ratio (see Box III.1): the employee starts work at the age of 20 and has uninterrupted work until the age of 55, and the real earnings profile over the working life is assumed to be flat. In the case of invalidity benefits, the replacement rates refer to 100 per cent disability.

The sources for rules in the different benefit systems are the same as for the old-age pension replacement ratio. However, in the case of unemployment benefits, the OECD Database on unemployment Benefits has been used extensively.

65. The main patterns of benefit generosity in the various schemes reported in Table IV.2 can be summarised as follows:

- Disability schemes offer the most generous compensation in most countries[24]. The comparatively high generosity in disability programmes is partly related to entry not being related to age in any country, so that a 55 year-old can get access to such benefits if entitlement conditions are met.

23. Table A.9 in Annex 1 gives disability benefit ratios by the earning levels and family situations, whereas Table A.10 gives unemployment-related benefit replacement rates for a single worker on average earnings broken down by ages 55 to 64.

24. As the replacement rates in Table IV.2 refer to full disability benefits, they differ from those reported in Blöndal and Pearson (1995) where the summary replacement rate is an average of partial and full benefits.

- Unemployment-related schemes differ widely across OECD countries in terms of benefit generosity. Countries with short maximum duration of benefits have very low summary replacement rates (United States, Japan, Canada), whereas countries with longer benefit periods have higher replacement rates. Indeed, in 1995 it was possible to draw unemployment-related benefits from the age of 55 to the standard retirement age in more than half of the OECD countries for which information was available[25]. This was either because of standard unemployment benefits being open-ended (the United Kingdom, Australia, Belgium and New Zealand) or because special arrangements have been established to extend benefit periods for older workers. The latter takes the form of special extensions of standard benefits to older workers (e.g. Germany and France), and/or entitlement to pensions typically at the age of 60 for men (e.g. Germany, Austria, Finland and Spain).

- Special early retirement schemes offer comparatively generous benefits in the countries where such schemes exist. In Belgium and France, it is more generous than either the disability or unemployment schemes; and in Austria and Italy, it is on a par with either of the main schemes. In Denmark, the special early retirement scheme is somewhat less generous than the unemployment-insurance scheme. (The private occupational early retirement scheme in the Netherlands is more generous than either the disability or unemployment schemes.)

As is the case with old-age pensions in most OECD countries, the generosity in non-employment benefit schemes is higher for low-earning workers than for high-earning workers, and spouse supplements imply higher generosity for families than for singles.

66. The generosity in most non-employment benefit systems has increased over time (Table IV.3). The increase in the generosity of disability benefits was concentrated in the 15 years to 1975 during which the unweighted average of the summary indicator rose by 10 percentage points, whereas the stability of the average since 1975 masks considerable movements in both directions for individual countries. The generosity in unemployment-related schemes for the elderly has risen over both the two sub-periods 1961-75 and 1975-95, due to a more generous unemployment benefit system in general and, in particular, extended benefit periods for the elderly. The only benefits that have not shown a strong increase in generosity are the special early retirement schemes (not shown in the table).

IV.3 Entitlement conditions

67. Entitlement conditions play a critical role in determining to what extent non-employment benefits can be used to facilitate early retirement. If disability is assessed against rigid medical criteria, there will be little scope to use such schemes for early retirement. Also, if receipt of unemployment benefits by 55-64 year-olds is conditional on active job search, the standard unemployment benefit system cannot be used to finance early retirement. Moreover, if entry into special early-retirement schemes is conditional on redundancy or dismissal, then it might be difficult for job leavers to use these schemes for early retirement.

25. These include Australia, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, New Zealand, Portugal, Spain and the United Kingdom. It is not possible to receive unemployment benefits from the age of 55 to the pensionable age in Canada, Japan, the Netherlands, Norway, Sweden, Switzerland and the United States.

68. Entitlement conditions have been relaxed for older workers in unemployment-related schemes in a number of countries (Table IV.4). In 1995, unemployment for a certain length (usually 1 year or 18 months) prior to a certain age (50, 55 or 60) opened up the possibility of early access to old-age pensions in eight OECD countries, provided that minimum contribution requirements have been met. In the early 1960s, this option was only possible in Austria, the other countries introducing unemployment pensions in the course of the 1970s. Since the late 1970s, seven OECD countries have also relaxed entitlement conditions for older workers' receipt of ordinary unemployment insurance benefits, notably exempting unemployed workers above a certain age from having to search actively for a job. This practice has effectively turned the ordinary unemployment benefit system into an early-retirement scheme. There is also evidence that work tests are applied more leniently in countries which do not formally exempt older workers from standard job-search criteria[26].

69. Entitlement conditions for special early-retirement benefits vary considerably in the few countries which continue to operate such benefit schemes. In the 1970s and early 1980s, several countries introduced schemes which made entitlement explicitly conditional on the retiring person being replaced by an unemployed and/or young person. Such schemes were abolished in the late 1980s in most of the countries (e.g. Germany and the United Kingdom), but are still operating in Denmark (for those 50 and older), Belgium (for those 55 and older), Luxembourg (for those 57 and older) and in Spain (though only for 64 year-olds being retired). Some other countries have tightened access to special early retirement benefits. For example, France quickly closed the option of job leavers having access to such benefits after this became possible in 1983, and entitlement to such benefits is currently restricted to older workers made redundant[27]. Entitlement conditions have also been eased in some countries in recent years. For example, the introduction of special early-retirement schemes in Norway in 1988 restricted access to persons 65 and older (the standard retirement age is 67), but the age limit was reduced to 64 in 1993 and a further reduction to 62 has become effective in 1998.

70. Given the importance of disability benefits as an income support for persons leaving the labour market before the pensionable age, entitlement conditions for this type of benefits are particularly relevant for the retirement decision. Disability benefits were originally intended as an income support for persons who were incapacitated, but several factors suggest that they have been used in some countries for other purposes[28]:

- The sharp increase of disability beneficiaries in general, and elderly beneficiaries in particular, would seem to be inconsistent with indicators suggesting that health conditions are improving for all age groups (and the increased use of rehabilitation measures).

- The large difference in invalidity rates among the elderly across OECD countries would seem to be inconsistent with objective indicators of comparative health conditions.

- Comparatively few in the 55-64 age group claim that they have gone into retirement because of health reasons, even in countries where the disability ratio is very high for the age group. For example, only 2 per cent of the retired in the age group in Austria claimed that they left

26. See e.g. OECD (1997).

27. The experience of France with these schemes is described in Blanchet, Brousse and Okba (1996).

28. In the case of the United States it has been argued that even if health conditions have been improving, early detection of health problems could account for the rise in disability beneficiaries, see Bound and Waidmann (1992).

their last job for health reasons, but as noted above more than half of the male population aged 55-64 is receiving disability benefits.

However, the sectoral pattern of early retirement reflects to some extent sectoral skill requirements: the incidence being significantly higher in some sectors making intensive use of motor skills (mining, construction and manufacturing).

71. In any case, there are strong indications that entitlement conditions have been *de facto* eased in disability benefit systems throughout OECD countries. This applies even to some of the countries where disability is supposed to be assessed against rigid medical criteria only (e.g. the United States, Japan, France, the United Kingdom, Canada and New Zealand). For example, though legislation has remained unchanged in the United States since 1965, there is general agreement that eligibility criteria have been applied more leniently (Haveman and Wolfe, 1984; Bound and Waidmann, 1992). There is also some evidence that invalidity benefits are used as early retirement benefits in the United Kingdom (Holmes and Lynch, 1990), and that medical criteria play less of a role than before. In countries (most continental European countries) where disability is assessed against the capacity to perform in a suitable job, depending on previous experience and/or training, increased labour-market problems may have *de facto* resulted in an easing of entitlement requirements.

72. The easing of eligibility requirements has been most notable in countries which have introduced an explicit labour-market criterion in granting disability pensions. Such a criterion was written into law in several European countries in the 1970s (Table IV.5), while court rulings introduced such a criterion as early as 1969 in Germany. In some countries, notably Austria, Spain (prior to 1985) and Norway, a labour-market criterion appears to be applied, though not with any explicit basis in law[29]. While only directed towards older workers in Sweden, Spain (from 1985) and Finland (as from 1986), it is clear that it was mainly used to assess eligibility of older workers to benefits. The strong increase in the number of disability beneficiaries in some of these countries prompted remedial action: the Netherlands abolished the criterion in 1987, and Sweden followed suit in 1991. The experience of both countries suggests that it may take considerable time before changes in legislation affect the actual practice of medical assessors.

73. From the foregoing discussion it would seem that most OECD countries have schemes which allow people to retire prior to the pensionable age set down in legislation. However, entitlement conditions are not always transparent, and much will depend on how entry is controlled by benefit officers and medical assessors. For example, benefit officers may exempt older unemployed workers from a work test in countries where such exemption is not written into law, especially if the older workers are entitled to unemployment benefits until they reach the pensionable age. Also, medical assessors may use a *de facto* labour market criterion in the granting of disability benefits to older workers, even if this is not permitted by statute. Nonetheless, entry is likely to be more difficult if entitlement rights are legally explicit. The few OECD countries with no relaxation of work tests for older workers, no statutory special early retirement schemes and a rigid medical assessment of disability include the United States, Japan, Canada, Iceland and Switzerland.

29. For Austria, see Ministry of Labour and Social Affairs (1995); for Norway, see e.g. Norges Offentlige Utredninger (1990).

IV.4 Impact on social security wealth

74. The availability of *de facto* early retirement benefits prior to the earliest age at which old-age pensions can be obtained has major implications for social security wealth accruals[30]. One year of work after such benefits become available implies that one year's worth of benefits is foregone and that an extra year of contributions must be paid. The additional year of work may result in higher old-age pensions, depending on the accrual profile, but the common practice of crediting years of unemployment, special early retirement and disability in calculating old-age pensions means that the level of old-age pensions is not affected in most countries. Thus, there are no gains to offset the cost in terms of contributions and lost benefits, and the size of the implicit tax on working for an additional year depends on the contribution and benefit replacement rates.

75. The impact of unemployment-related benefits on social-security wealth accruals in 1995 is depicted in Figure IV.1 for selected countries and wealth accruals for the 55-70 age span are reported in Table IV.6. These benefits are assumed to become available at the age of entitlement to unemployment pensions or at the age at which the active job-search requirement is removed for the elderly, or at the age at which unemployment benefits can be obtained until the pensionable age. The accruals change substantially for several of the countries examined. Denmark, which had only modest disincentives to work in its old-age pension system prior to the standard retirement age of 67, now registers substantial implicit taxes on continued work after 55, due to the relaxation of the work test as early as 50 and generous replacement rates. The disincentives also increase substantially in Ireland due to unemployment pensions being available at 55. In France, the availability of unemployment benefits without active job search also implies sizeable drop in social-security wealth after the age of 56, whereas the old-age pension system provides strong incentives to remain in work until the required contribution history has been completed.

76. When the disability system offers generous compensation, there is an incentive to enter into the system as early as possible. As can be seen from Table IV.6, continued work after 55, if it is an option to access disability benefits at that age, would in most countries result in a sharper drop in social-security wealth than in the case of retiring into unemployment-related schemes. Indeed, the implicit tax would be very high in several countries. In the countries which still retain a labour-market criterion in granting disability pensions, continued work from the age of 55 to 70 would reduce social security wealth by the equivalent of 6½ years of earnings in Germany to 10 years of earnings in Finland. In Norway and Austria, where a labour-market criterion is tolerated in practice, the drop in social security wealth is equivalent to 9 to 10 years of earnings. Other countries with very high implicit tax on continued work include Sweden (which abolished the labour market criterion in 1991) and Portugal.

77. The disincentives to work are also strong in special early-retirement schemes in some of the countries still operating such systems. For example, the opportunity to enter into the French scheme (AFSNE) at the age of 55 (which is only possible in exceptional circumstances, the standard entry age being 57) implies higher implicit taxes on work up to the standard age of retirement and even higher taxes than if the unemployment or disability route is taken. In Luxembourg and Denmark, the special early retirement schemes strongly discourage work at older ages. The disincentives are less pronounced in Spain and Norway as such schemes are only open to persons close to the pension age.

30. Some of the NBER studies referred to earlier take these benefits into account when calculating social-security wealth accruals.

78. A few countries have embarked on reforming their unemployment-related and disability systems, aiming at making access more restrictive. The most important lesson drawn from the experience of reforming countries is that tightening one benefit system may result in a greater use of other systems. For example, the tightening of the disability system in the Netherlands coincided with a strong increase in claimants of unemployment and social welfare benefits, and this might be particularly relevant for older workers as they have benefits of long duration[31]. Also, the tightening of the disability system in Norway coincided with an easing of entitlement conditions for special early-retirement benefits, and substitution between the two schemes appears to have taken place. In general, reforms to reduce disincentives to work need to look at all possible early retirement programmes together in order to reduce the danger that benefit claimants migrate from one system to another.

IV.5 Concluding remarks

79. Reforms directed at reducing incentives for early retirement will have to tighten access to the income support programmes discussed in this chapter. It would seem appropriate to separate the dual functions that these schemes serve for older workers at present. Thus, unemployment-related benefits under such a reform would be made conditional on active job search by older workers and long duration of benefits removed. Also, disability benefits would be granted on medical criteria alone, and structures established so that it becomes more difficult for individual assessors to apply other criteria. Those neither seeking jobs nor incapacitated for health reasons could be redirected to special programmes, which would increase the transparency of this type of intervention. Entitlement conditions in these early retirement schemes could then be gradually tightened, limiting entry to those who would have to assume unreasonable costs in order to stay active.

31. This is discussed in Lindeboom, 1998.

V. AN EMPIRICAL ANALYSIS OF THE RETIREMENT DECISION AMONG OLDER WORKERS

80. Panel A of Figure V.1 suggests a close correlation between average retirement age and implicit tax rate on continued work across OECD countries in 1995. The countries with low implicit tax rates tended to have higher average retirement ages, and vice versa. Thus, this simple correlation points to a potentially high impact on the average retirement age of measures which *de facto* create strong incentives to early retirement. However, labour force participation of older workers is more complex than these correlations suggest. This becomes clear by looking at Panel B in Figure V.1 which plots average retirement ages and the implicit taxes on labour for 1967 and shows no significant relationship between the two variables.

81. This chapter offers an econometric analysis of the labour supply of older workers. It considers the incentives embedded in old-age pension and other non-employment benefit schemes as well as other factors affecting the labour supply of older workers, which often interact with social security incentive structure. It is based on pooled cross-country and time series data[32]. This international approach is preferable to country-specific time series analyses because most of the institutional and policy factors affecting labour supply decisions among older workers show only moderate time variations at the national level, but marked disparities from an international perspective. Thus, a cross-country analysis may provide a better basis for the identification of the potential effects of reforms of social security systems[33]. The major drawback of this international approach is that the number of policy and institutional factors that can be included in the analysis is limited given the lack of comparable data across a large number of OECD countries. Moreover, like any aggregate analysis, individual characteristics are not considered in this study. For these reasons, in the final section, we report the results of microeconometric case studies carried out in the context of the OECD work on the retirement decision[34]. By their very nature these studies are country specific and generally focus on the most recent past. However, they point to some regularities across countries and their policy simulations seem broadly in line with those developed in the aggregate analysis.

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32. The sample includes data for 15 countries (Australia, Canada, Finland, France, Western Germany, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom and the United States) over the 1971-1995 period.

33. Elhorst (1996) used a pooled time-series cross-section dataset to analyse regional labour force participation rates across the Member states of the European Union.

34. See Quinn *et al*. (1998) for a study on the United States; Antolin and Scarpetta (1998) for a study on Germany; Miniaci (1998) for a study on Italy; Miniaci and Stancanelli (1998) for a study on the United Kingdom; and Lindeboom (1998) for a study of the Netherlands.

V.1 The determinants of participation rates among older workers

82. The labour supply of older workers is influenced by economic and labour market factors[35]. In this study, it is modelled using a reduced-form equation that mimics an intertemporal utility comparison. The dependent variable is the number of older males in the labour force divided by the total male population aged 55-64[36]. The choice of the participation rate as the dependent variable instead of hours worked is mainly due to the lack of data on hours by age groups in most countries[37]. Since the retirement decision is a discrete labour market outcome in most countries, and only a limited number of individuals combine retirement benefits with part-time work, the use of participation rates should not represent a major problem in the empirical analysis[38].

83. The explanatory variables include different measures of the non-employment benefits available for older workers. As often stressed (see Parsons, 1980 amongst others), it is important to specify the value of non-employment benefits in relative terms. This brings about the basic nature of the work/leisure work/retirement choice of older individuals. Four replacement rates are considered in the empirical analysis, one for each of the possible early retirement routes discussed in the previous chapters: i) unemployment-related benefits; ii) early retirement benefits; iii) disability benefits for occupational and/or labour market reasons[39]; and iv) the old-age pension benefits[40].

84. The replacement rates may offer only a partial account of the economic incentives to early retirement embedded in the different non-employment benefit systems. Their use implies, in particular, intertemporal separability, i.e. that wages at other points in time in the work life as well as future pension benefits are irrelevant for the retirement decision. In most cases this is a strong assumption which is not borne out in the actual functioning of the pension systems. As discussed above, pension systems are often not actuarially neutral in the sense that the pension wealth is not independent of the age of retirement. In order to take into account this characteristic of the pension system, the accrual rate for postponing retirement from 55 to 65 years of age, as defined in the old-age pension formula, was also considered,. The variable indicates the relative increase in the pension benefit that a worker can expect by staying

35. Health status also affects the retirement decision of older workers. This latter factor, however, is not considered in the empirical analysis developed in this paper because of the lack of cross-country comparable data. In particular, data referring to the subjective assessment of the health status of older people are not readily available and objective measures, albeit available for some countries, are not generally significant in explaining aggregate labour supply changes among older workers (see Johnson, 1988).

36. Data are derived from the Labour Force Surveys (LFS) of the different countries (see OECD, Labour Force Statistics, various issues).

37. Mincer (1962), Ashenfelter and Heckman (1974) and Bowen and Finegan (1969) have used a similar approach, amongst others.

38. Penceval (1986) discusses how the labour supply function of a single individual can be aggregated across individuals in order to make the formulation suitable for an empirical analysis at the aggregate level. Following his formulation, the participation rate reflects the share of population who want to work at the current wage, controlled for a range of microeconomic-oriented factors -- including alternative non-employment benefits -- which are aggregated across individuals.

39. The latter indicator has been calculated considering the replacement rates for disability pensions and the eligibility criteria which in some countries include occupational considerations (generally the lack of a job in a similar occupation) and, more generally, labour market considerations.

40. See Box III.1.

employed ten more years. Likewise, many social security systems have a standard retirement age that is mandatory for certain workers. Thus, this variable is also included in the set of explanatory variables.

85. Potential discouragement effects among older workers in countries with important labour market imbalances are captured by the unemployment rate. The latter is jointly determined with participation rates in the labour market. To minimise endogeneity problems, the unemployment rate of prime-aged workers was used instead of the old age unemployment rate or the overall unemployment rate. However, the unemployment rate may not fully grasp the labour market pressure on older workers to retire early. Like most labour market variables, participation rates of older workers are also likely to be influenced by institutional factors, which affect wage settings and contribute to shaping employment protection regulations. Given data availability, cross-country differences in labour market institutions are summarised in this study by the union density index – the proportion of workers who are members of trade unions.

86. Moreover, the past three decades have witnessed marked changes in the size and composition of the working age population which could have significantly affected the labour supply of older people. In particular, the working age population has increased in all OECD countries: the largest hikes took place in the 1960s and 1970s in most of them, while in others they were recorded in the 1980s. While in the 1960s and 1970s the increase in the working age population was accompanied by a consistent process of job creation in most countries, employment growth has shown major cross-country differences in the 1980s and 1990s. Among the 15 countries in the sample, the United States, Canada, Japan, Australia, Ireland, the Netherlands and Norway registered rising employment levels, albeit generally at a lower pace than in the previous two decades, while France, Italy, the United Kingdom, Finland, Portugal, Spain and Sweden recorded stable or even declining employment. The combination of these population and employment dynamics has produced significant drops in employment rates in most European countries, while stable or modest reductions were observed in North America and Japan[41]. Demographic developments have also altered the composition of potential labour supply, especially in the past two decades which witnessed the largest increases in the share of the prime age population in the total working age population. To the extent that prime age workers are better educated -- and thus have higher productivity potentials -- than their older colleagues, they may have crowded out job opportunities for the latter, especially in countries with declining employment rates.

87. In a fully flexible labour market, demographic changes that affect the size and composition of labour supply, as well as labour productivity, will not lead to growing labour market imbalances, as aggregate and relative wages will adjust accordingly. However, in the presence of relative and absolute wage rigidities, these demographic changes may lead to higher unemployment and, possibly, stronger pressures to early withdraw of older workers from the labour market. To test whether demographic factors produced significant effects on participation rates of older workers, the share of the prime-age population in the total working age population is also considered amongst the explanatory variables[42].

88. Given the importance of labour market institutional factors in determining the flexibility of aggregate and relative wages, the empirical analysis also explores the importance of the interaction between the degree of centralisation/co-ordination of the wage bargaining system and the demographic

41. In the nineties, Ireland and the Netherlands, in contrast to most other European countries, also witnessed a stabilisation or even an increase in their employment rates.

42. By definition, this variable indicates changes in the composition of the working age population. However, given the high and fairly constant participation rates among prime-age workers, it also accounts for changes in the size of the labour force.

variable[43]. The 15 countries of the sample are grouped according to the degree of centralisation/co-ordination of wage bargaining (decentralised; intermediate with low co-ordination; centralised or intermediate with high co-ordination)[44].

89. The participation rate equation can, therefore, be expressed as follows (omitting for simplicity country and time suffixes):

$$PR_{old} = f\left(UR, UDENS, PA_{pop}, RR_{U}, RR_{dis}, RR_{ER}, RR_{OA}, AR, RA\right) \qquad (1)$$

where:

PR_{old} = *participation rate of older males*;

UR = *prime-age male unemployment rate*;

UDENS = *proportion of workers who are members of trade unions*;

PA_{pop} = *share of the prime-age population in the total working age population*;

RR_{u} = *replacement rate of unemployment-related benefits for older workers*;

RR_{dis} = *replacement rate of disability benefits* in programmes adopted for labour market purposes. The replacement rate is considered when occupational and/or labour market considerations are taken into account in the assessment of disability;

RR_{er} = replacement rate for special early retirement;

RR_{oa} = (expected) *replacement rate for old-age pensions*;

AR = *accrual rate*. This variable indicates the per cent change in old-age pension benefits for a 55-year old male by working for 10 more years[45];

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43. The collective bargaining structure of each country has been defined with the help of indicators of the predominant level of wage bargaining and the level of co-ordination among employers, on the one hand, and among trade unions, on the other hand. Three groups have been used to capture the level of centralisation and co-ordination (1 = low; 2 = intermediate; 3 = high). The summary measure of centralisation/co-ordination was computed on the basis of the values assigned to the two individual indexes, considering the degree of centralisation first, and then the degree of co-ordination. In countries with decentralised wage bargaining, it was assumed that different degrees of co-ordination did not modify significantly the potential labour market outcomes: wages were still considered to be predominantly determined by firm's conditions. However, co-ordination was considered crucial in the case of intermediate (sectoral) wage bargaining: each bargaining unit could generate dis-employment effects if the decisions of employers associations and sectoral trade unions are not well co-ordinated. Finally, high centralisation is generally accompanied by a high degree of co-ordination and countries in this group were considered as highly centralised/co-ordinated. The classification is based on recent OECD publications, including the 1995 and the 1997 issues of the OECD Employment Outlook (Chapter 5 and Chapter 3, respectively) and the special chapters on Implementing the Jobs Strategy in the OECD Economic Surveys.

44. The three groups are as follows: group 1 (decentralised wage bargaining) = United States, Japan, Italy, United Kingdom and Canada; group 2 (intermediate) = Australia, France, Ireland, Netherlands, Portugal and Spain; and, group 3 (centralised/co-ordinated) = Germany, Finland, Norway and Sweden.

RA = *the standard age of entitlement to public old-age pensions.*

90. From the discussion developed in this study, the different non-employment replacement rates should be negatively related to participation rates, i.e. the greater the generosity of the non-employment schemes the lower the participation rates, other things being equal. Along the same lines, participation rates of older workers are likely to be positively related to the accrual rate for postponing retirement, and to the official age of retirement. Especially in countries with generous non-employment benefits, growing labour market imbalances are likely to reduce the labour supply of older workers due to discouragement effects. The relationship between the labour supply of older workers and labour market institutions, summarised in this analysis by the union density and the degree of centralisation of wage bargaining, is more difficult to assess. In highly unionised/centralised countries, the interest of older workers may be reflected in the wage bargaining process, which would lead to more favourable labour market conditions for them. At the same time, however, countries with low unionisation and decentralised wage bargaining have generally a greater flexibility in wage setting, creating greater possibilities for older workers to adjust hours supplied and often to combine earnings from work and social security benefits.

91. Table V.1 presents the dependent and independent variables for the 15 countries of the sample at the beginning (1971) and the end (1995) of the sample period. The first element to note is the growing cross-country disparities in participation rates: in the early seventies the participation rates of older males (55-64) were in the range between 70 to 90 per cent (with the notable exception of Italy at 59 per cent), while they were in the range between 42 (France and the Netherlands) and 85 per cent (Japan) in 1995. There are also consistent cross-country and time series variations in the explanatory variables. The unemployment rate has increased in most countries, but in particular in the European economies, while the most visible demographic changes can be found in Canada, Finland, the Netherlands, Norway and the United States. As stressed in the previous chapters, the generosity of non-employment benefits has generally increased in the OECD countries over the 1971-1995 period. Likewise, pension reforms in the past two decades have often increased the incentives for early retirement: the accrual rate for postponing retirement has generally declined, in some cases dramatically. Finally, the standard age of entitlement to old-age pensions has declined in France (from 65 to 60) in Ireland (from 70 to 66) and in Sweden (from 67 to 65).

V.2 The estimation approach

92. Feasible Generalised Least Squares (FGLS) were used to estimate equation (1). This estimation procedure allows controlling for group-wise heteroscedasticity and for country-specific fixed effects. Since participation rates of older workers tend to react only slowly to changes in social security systems and labour market structural factors, the estimation procedure utilised a three-stage approach to control for country-specific serial correlation of residuals. Each model was firstly estimated with least squared to obtain consistent estimates of the autocorrelation terms. In a second stage, data were transformed, by taking each time series separately and using the Prais-Winsten transformation of the original data. This transformation removed the country-specific autocorrelation, and the transformed data became suitable for the estimation of group-wise disturbance variances which, in the third step, allowed calculating the heteroscedastic regression (see Greene, 1993 for more details).

93. Regression diagnostic was also performed to identify outliers in the sample set. Estimates based on a relatively small panel of cross-section and time-series data may be significantly affected by a few

45. It is assumed that older workers started to work at the age of 20 so that they have a potential contribution period of 35 years at the age of 55.

observations which increase the standard error of the regression and/or affect disproportionately the estimated coefficients. In this study, outliers have been identified with the help of the so-called leverage-residual plot, which is based on the *studentised residuals* and the *leverage points*[46]. Moreover, two regression diagnostics were considered to help the identification of the outliers in the leverage-residual plot. The *DFITS* statistics measures the influence of an individual observation on the predicted dependent variable, or fitted values. The *COVRATIO* statistics measures the effect of an individual observation on the efficiency of the coefficients' estimation (see also Fiebig, 1987 and Belsley *et al.*, 1980 for more details)[47].

V.3 The empirical results

94. Tables V.2 presents the results of different specifications of equation (1). Model 1 does not control for the country-specific serial correlation of residuals, as do Models 2 to 5. The first three models cover the period 1971-1995, for which data are available for all variables and for all the 15 countries. Model 4 is based on an unbalanced database, covering all available observations from 1961 to 1995. To assess possible structural changes in the estimated participation rate equations, models 3 and 4 share the same structure but were estimated for the restricted and expanded databases, respectively. Finally, Model 5 is based on the 1975-1995 sample set but also considers the effects that the interactions between labour market institutional factors and demographic changes may have on the labour supply of older workers.

95. The key results of Table V.2 are summarised in Table V.3. They suggest that labour market conditions and incentives embedded in the pension systems play a significant role in explaining cross-country and time-series variations in the participation rates of older men in the OECD countries. The empirical results suggest that a one percentage point increase in the unemployment rate may produce a drop in older workers' participation rates of about 0.6-0.9 percentage points in the longer run. As an example, the dramatic increase in unemployment in Spain in the 1980s might have led to a decline in the older male participation rate of 8-9 percentage points. In most of the other European countries the effect of the marked increases in unemployment could be considered responsible for a decline in the participation rate of the order of 3-5 percentage points.

96. The empirical results also suggest a significant impact on old age labour supply of the demographic changes which have occurred in the past two and a half decades. In particular, changes in the size and composition of the labour force due to the entry into the working age of the baby boom generation seem to have produced significant crowding out of job opportunities, creating a strong pressure to early withdrawal among older male workers. As stressed above, the effects of demographic changes on participation rates are likely to involve rather complex transmission mechanisms which also depend upon labour market institutions. Model 5 (Table V.2) offers an attempt to evaluate this interaction by allowing the parameter of the demographic variable to vary according to the degree of centralisation/co-ordination of wage bargaining. The results point to a stronger effect of changes in the labour supply on participation rates in countries with intermediate levels of centralisation (i.e. sectoral wage bargaining with lacking

46. For each observation, the studentised residual is the t-statistics of a dummy which has a value equal to 1 for the observation and zero everywhere else. The leverage point is the corresponding diagonal element in the least-squared projection matrix. It proxies the distance between the individual observation and the centre of the data.

47. This approach identified nine observations as significant outliers over the sample of 375 observations: the 1971 observation for Finland; the 1979 observation for France; the 1991 and 1992 observations for Germany; the 1971 and 1985 observations for Ireland; and the three observations 1971-1973 for Portugal.

co-ordination)[48]. This is probably due to the difficulty that intermediate systems have in internalising in the bargaining process the negative externalities on vulnerable groups, including (low-skilled) older workers[49].

97. As expected, the replacement rates for unemployment-related retirement are negatively signed and statistically significant, while those for the special early retirement schemes are often not statistically significant. The estimated parameters suggest that a ten percentage points increase in unemployment-related benefits could be related to a decline in participation rates of about 1.5-2 percentage points. In other words, the potential effects on participation rates of the significant increases in the unemployment-related replacement rates (see Table V.1) are of the order of -9.3 percentage points in Portugal, -8 percentage points in Finland, -7 percentage points in Australia and -5.8 percentage points in the Netherlands.

98. The coefficients of the disability schemes for occupational and labour market reasons are characterised by large standard errors. This contrasts with the evidence discussed above of a widespread utilisation of disability schemes as a vehicle for early retirement. These unsatisfactory results are most likely due to the difficulty in identifying the countries where disability schemes have *de facto* been used to reduce the labour supply of older workers. Participation rates are only allowed to be influenced by disability benefits in countries where occupational criteria and labour market conditions are explicitly listed among the factors considered in granting disability benefits. Whilst not stating these conditions explicitly, other countries may use local and/or individual labour market conditions in the assessment of applications to disability benefits. In these latter cases, however, it is difficult to gauge the weight assigned to these factors as compared to pure health considerations and whether the weight has changed over the period covered by the data.

99. Several features of the old age pension system seem to play an important role in the retirement decision. In particular, increasing the relative pension accrual rate by ten percentage point would lead, other things being equal, to an increase in participation rates of about 1.3-2.5 percentage points depending upon the specification considered. As shown in Table V.1, the accrual rates declined significantly in Finland, Sweden and Norway over the 1971-1995 period. The estimated impact of these changes in the accrual rates on older male participation rates are estimated to be around -3 percentage points in Sweden and around -2 percentage points in Finland and in Norway. Along the same lines, an increase in the age of entitlement to old-age pension of one year, while leaving in place the different early retirement schemes, will raise participation rates by 0.8-1 percentage points. The effects on participation rates of the observed decline in the standard retirement age over the 1971-1995 period can be quantified in -5.5 percentage points in France, -4.4 percentage points in Ireland and -2.2 percentage points in Sweden.

V.3.1 Accounting for the decline in labour supply of older males

100. 101. Using the empirical results of the previous session, Table V.4 offers a breakdown of the cross-country differences in the participation rates of older workers over the entire sample period (Panel

48. In particular, the Wald tests suggest that the coefficient for the demographic variable for the intermediate countries (sectoral wage bargaining with lacking co-ordination) is significantly different (higher) than both that for decentralised and highly centralised countries.

49. This result is also consistent with evidence of a U-shaped relationship between labour market performances and the centralisation of wage bargaining, whereby both highly centralised and fully decentralised countries offer better labour market outcomes than intermediate systems (see Clamfors and Driffill, 1988; Scarpetta, 1996).

A) and over the past decade (Panel B). The average of the 15 OECD countries of the sample is used as a reference. The second column in both panels reports the estimated differences between the OECD average and the value observed in each country, while the other columns display how these differences can be explained by differences in the explanatory variables. It should be stressed at the outset that even after controlling for labour market and institutional factors, a large fraction of the cross-country differences remains unexplained. This is not surprising taking into account that a number of unmeasured (or un-measurable) factors are omitted from the empirical analysis, including a wide variety of institutional, cultural and historical factors. Therefore, in reading the empirical results in Table V.4 it should be kept in mind that other factors play a role in the observed behaviour of labour supply of older workers, with different intensities across countries. In this study, unexplained differences and country specific measurement errors are identified through country-specific fixed effects.

102. Discouragement effects explain a significant fraction of cross-country differences in participation rates, especially in the more recent period (1985-1995) when labour market imbalances have widened in a number of OECD countries. In Spain and Ireland in the 1985-95 period, 3.8 to 4.7 percentage points of the gap between their respective participation rates and the OECD average can be explained by the higher unemployment rates, while at the other extreme of the spectrum, in Japan, Norway and Sweden 2 to 3 percentage points of the positive gap between their rate compared with the average can be attributed to better than average labour market conditions over the 1985-95 period.

103. Differences in the "generosity" of the non-employment benefits also contribute for a consistent fraction of the cross-country differences in participation rates. Generous unemployment-related benefits compared to the OECD average are estimated to have contributed to lower than average participation rates amongst older workers of about 4 percentage points in Portugal, 3.6 percentage points in Finland, and about 3 percentage points in the Netherlands and Spain in the 1985-1995 period. On the contrary, lower replacement rates are estimated to have significantly contributed to maintain relatively higher than average participation rates in Japan (+4.4 percentage points), the United States (+3.8), Norway, the United Kingdom and Canada (+2 to +2.2).

104. Cross-country differences in the pension accrual rate seem to have played a relatively moderate role in the observed differences in labour supply of older male workers. In the 1985-1995 period, the absence of any gain in postponing retirement after 55 years of age in Australia, Canada, Ireland, Spain, Sweden, and the United States contributed to reduce participation rates by 1.5 percentage points compared with the OECD average. At the same time, the relatively high accrual rates embedded in the German and British public pension system led to a 1-1.7 percentage points higher participation rates. The estimated model also suggests that the lower standard retirement age in France and Italy may have contributed to reduced participation rates amongst older workers by about 4.6 percentage points, while some 3 percentage points higher participation rate in Norway can be attributed to the higher (67) standard retirement age.

V.3.2 Changes in social security wealth and the labour supply decision

105. In the discussion so far, we have focused on the role that each component of the old-age pension system as well as of the other non-employment benefit schemes has on the labour supply of older workers. However, there are close interactions between these factors which can not be easily considered within our analytical framework. To shed light on the overall impact of different pension and non-employment benefit structures on labour supply, Table V.5 presents the results of a restricted model of labour force participation in which most of the different features of the old-age pension system are merged together in one summary indicator: the old-age pension wealth (Model 6). As discussed above, the old-age pension

wealth is the sum of the discounted value of expected old-age pension benefits minus the discounted cost of obtaining such benefits. Since unemployment-related benefits also affect significantly labour force participation of older workers, Model 7 in Table V.5 considers the "social-security wealth" which incorporates unemployment-related benefits prior to the entitlement to old-age pensions. The empirical analysis focuses on the pension and social security wealth accrual which measures the differences in the wealth (relative to annual earnings) by postponing retirement from 55 to 65 years of age.

106. The empirical results confirm the importance of old-age pension and unemployment-related benefits on the participation of older workers. The parameters of the social-security wealth suggests that a 10 percentage points reduction in the implicit tax on continued work from 55 to 65 years of age would lead to an increase in participation rates among older males of about 1.8 percentage points. This implies that the significant drops in the pension wealth accrual could have led to a fall in participation rates of about 5.5 percentage points in Italy, while the drops in the broadly-defined social-security wealth accrual could have led to a fall of about 8-9 percentage points in Finland, the Netherlands and Portugal.

107. As stressed above, structural labour market factors may have particularly strong effects on the labour supply of older workers in countries where there are generous non-employment benefit systems for older workers. Table V.5 (Models 8) sheds some light on this issue by assessing the importance of the interaction between demographic changes and the incentives to early retirement[50]. The results suggests that changes in the size and composition of the working age population have a stronger impact on participation rates in countries with generous social security benefits than in those with moderate incentives to early retirement. This is particularly evident if unemployment-related benefits are also considered in the assessment of the incentives for early retirement.

V.3.3 Moving to an actuarially neutral system

108. The summary measure of the pension (or social-security) wealth accrual also permits to run a policy simulation in which the OECD social security systems are reformed so as to be actuarially neutral (Table V.6). A neutral system implies that the pension (or social-security) wealth is independent of the retirement age and therefore does not distort the retirement decision. In the case of the social-security wealth, moving to a neutral system would also imply that unemployment-related benefits prior to old-age pension benefits should be replaced by appropriately adjusted early pension benefits.

109. Moving to an actuarially neutral system would significantly increase the labour supply of older workers in the OECD countries. The cross-country variability of the participation rates of males aged 55-64 would also be markedly reduced, with most countries reaching a participation rate of at least 60 per cent (France, Finland and the Netherlands being notable exceptions). The largest increase would be in Italy, where the move towards a neutral system could bring the participation rate back to its levels of the 1950s and 1960s. France, Finland, the Netherlands and Portugal would also experience marked increases in their participation rates, especially if unemployment-related benefit systems were to be included in the

50. The 15 OECD countries have been grouped according to the level of the pension wealth accrual as follows: group 1 (low variation in the wealth) = Australia, Canada, Netherlands, Portugal, Sweden and the United Kingdom; group 2 (intermediate variation in the wealth) = France, Germany, Ireland, Norway and the United States; and group 3 (large variation in the wealth) = Finland, Italy, Japan, Spain. According to the level of the social security wealth accrual, the grouping is as follows: group 1 (low variation in the wealth) = Australia, Canada, Japan, Norway, Sweden, United Kingdom and United States; group 2 (intermediate variation in the wealth) = Germany, Ireland and Portugal; and group 3 (large variation in the wealth) = Finland, France, Italy, Netherlands, and Spain.

reform package. However, the simulation suggests that their participation rates would remain at the lower end of the OECD range, even after such a reform (with the exception of Portugal). In the other European countries, the labour supply of older male workers would increase to around 65 per cent of the older male population, while in the United States and Japan it could approach 70 per cent and 89 per cent of the older male population, respectively. Lack of data made it impossible to estimate participation-rate equations for the 65-70 year-olds. Yet, the generally very high tax rates on continued work after 64 suggest that a move to a neutral system could have sizeable effects for this age group.

V.4 A summary of the microeconometric studies of the retirement decision

110. The OECD work on the retirement also involved five microeconometric studies: the United States, Germany, Italy, the United Kingdom and the Netherlands. These countries offer a representative sample of the wide difference in pension arrangements across OECD countries.

111. The empirical analysis developed in these five country-studies is based on micro-data drawn from different sources, including special surveys for the study of retirement (the Health and Retirement Study in the United States and the CERRA panel survey in the Netherlands) and general household surveys that include suitable information regarding the labour supply of older people. The econometric analysis investigates the probability of moving from the employment status to retirement. The use of competing risk model allows considering different exit routes, such as unemployment-related retirement; disability retirement; special early retirement; and old age retirement. The factors affecting the retirement probability comprise: i) individual characteristics such the age, gender, education attainment, health status, occupation and sector of affiliation; ii) household characteristics, including the size of the household, whether the individual is the head of the household or not, and the labour market status of the spouse; and, iii) economic variables, including wage earnings, entitlements to public and occupational pension plans, and the existence of other sources of income. Given the longitudinal nature of the databases at hand, the analysis for Germany and the Netherlands is conducted using a duration model, which allows information to be updated as individuals age. For the other studies, the explanatory variables are fixed and it is not possible to assess whether a structural condition (i.e. chronic bad health) or the change in a given condition (i.e. deterioration in the health status) are driving the retirement decision (see Bound *et al.*, 1997).

112. The micro studies confirm that the pattern of the transition from work to retirement differs markedly across countries. In the continental European countries, retirement is often characterised by an abrupt transition from full-time work with the prime-age employer to inactivity prior to the standard age of entitlement, as early access to old-age pension is conditional on terminating work and earned income from work often implies the withdrawal of disability benefits. The United States and the United Kingdom show very different transition patterns[51]. The termination of work with the prime-age employer in these countries is frequently followed by a move to a new employer, thanks to private pension plans that do not prevent older workers from combining occupational pensions and earned income from another employer.

51. Social security in the United States has an earnings test from 62 to 69 years of age. The "labour tax" rate declines with age as does the exempted amount. Moreover, recent reforms have introduced a gradual increase in the amount of earnings that is exempted from the tax: from $13,500 in 1997 (for those 65 to 69) to $14,500 in 1998, $17,000 in the year 2000 and $30,000 in 2002. In the United Kingdom, the 1989 reform of the state pension system abolished the "earnings rule". See Quinn *et al.* (1998); Miniaci and Stancanelli (1998); Blundell and Johnson (1997); Kapteyn and de Vos (1997).

The transition in the United States is also characterised by a much more gradual reduction in hours worked than in other countries[52].

113. One of the key results of all country-studies is the very strong impact of socio-demographic factors on the retirement decision. Women tend to retire earlier than men. They make greater use of special early retirement schemes (Germany and the Netherlands) but also have access to full old age pensions earlier than men because of the lower standard age of entitlement to pension (Italy and the United Kingdom). Earlier transition to retirement is also a common feature among civil servants and workers in the manufacturing sectors, while people in the service sector and especially the self-employed tend to retire later than other workers[53]. Even after controlling for earnings and other sources of income, better educated workers tend to stay longer in the labour market, as do those in professional occupations compared with white- and especially blue-collar workers. These latter results suggest that the preference for leisure may vary significantly across individuals depending on the satisfaction they extract from working at later ages. To the extent that higher education enables workers to have access to more stable jobs, these findings also indicate a relationship between job security and the retirement decision.

114. The retirement decision is also influenced by household characteristics. The US and Italian studies suggest that retirement is a joint decision of the two partners: the probability of one spouse to retire is higher if the other spouse is not active than if the spouse is employed[54]. However, the US study also suggests that the higher the spouse's wage, the more likely the individual is to retire. In the United States, the United Kingdom and Italy, heads of large households tend to stay longer in the labour market, most likely because the fall in living standards due to lower than wages pension benefits may not be strong in small households but significant in large ones[55].

115. While, the health status is an important element in all early withdrawals of older workers from the labour market, poor health conditions are decisive in the case of people moving to a disability benefit scheme[56]. This result holds for all country-studies and irrespective of the indicator used to characterise the health, i.e. self assessment and objective indicators.

116. The microeconometric results support the aggregate analysis discussed in the previous section with respect to the role of economic incentives on the labour supply of older workers. Not only do the

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52. Indeed, more than 10 per cent of full-time workers aged 55-61 in 1992 moved to a part-time job by 1996, and more than one-third of those in the same age group already working part-time in 1992 left the labour market in the following four years (29 per cent among full-time workers). Part-time is defined in the US study as working less than 1600 hours per year: The empirical results also confirm that the probability of moving to part-time increases substantially with age and is relatively less marked among individuals with dependent children.

53. See, in particular, Quinn *et al.* (1998) and Antolin and Scarpetta (1998). Quinn, Burkhauser and Myers (1990) compared the retirement patterns of the self-employed with those of the employees in the United States.

54. Blau and Riphahn (1997) found similar results for Germany using individual data from the German Socio-Economic Panel.

55. Using micro data from the Labour Force Survey of Spain, Alba-Ramirez (1997) also found that the household size and the presence of children reduce the probability of retirement among older male workers.

56. These findings are also supported by microeconometric evidence from detailed studies on the relationship between health conditions and the retirement decision. See Kerkhofs *et al.* (1997) and Bound *et al.* (1997).

eligibility conditions for early and old age retirement shape the hazard function[57] but also the level of the pension benefits is decisive in the retirement decision. Due to data limitations, the Italian study considers only the pension level relative to the previous wage (i.e. the replacement rate) and finds that this variable positively influences the retirement decision[58]. However, the simple replacement rate may not be the most suitable measure of the incentives embedded in the pension system. Especially in countries where retirement is an absorbing status (i.e. the withdrawal is permanent) and people do not combine pensions with wage earnings from part-time work, what is relevant in the retirement decision is the age profile of the pension wealth and the expectation about future job opportunities. As discussed above, the pension wealth declines with age in most OECD countries, thereby creating a disincentive for working beyond the minimum age for early retirement. In addition, if the marginal utility from leisure increases with age the fall in utility by delaying retirement may be even greater than that estimated with the pension wealth calculations. The German and the Dutch studies use the net present value of the pension wealth relative to the previous wage as an indicator of the economic incentive to retire. They both found a strong impact of this variable on the choice of older workers to withdraw from the labour market.

117. Moreover, the German study attempts to calculate the *option value* of postponing retirement (see also Lazear and Moore, 1988; Stock and Wise, 1990). For each retirement age, the option value indicates the opportunity cost of retiring, when the alternative is to retain the option to retire at a later age. The rationale of this approach is that people compare the best of the expected future possibilities with the value of retiring now (Stock and Wise, 1990). Despite the empirical difficulties in calculating the option value[59], the results for Germany confirm a strong and statistically significant impact of pensions on labour supply decision: as soon as the option value of postponing retirement becomes small (or negative) people leave the labour market and start drawing pension benefits[60].

118. The empirical results of the country studies were used to perform a number of microsimulations on the potential effects of pension reforms. Compared with the simulations discussed in the previous section, they have the clear advantage of considering the interactions between institutional and socio-economic factors at the micro level. However, the results of these simulations are, by their very

57. In the Netherlands, a significant number of older workers leave the labour market as soon as they become entitled to the generous employer-based early-retirement schemes. A similar behaviour is observed in the United Kingdom, where a consistent number of older workers move into retirement as soon as the occupational pension becomes available (generally from 55 years of age).

58. Pedersen and Smith (1991) also found a strong positive effect of the old-age pension replacement rate on the retirement decision in Denmark using a competing risks hazard model on longitudinal data (1976-1986). In particular, the authors found that the replacement rate had a strong effect on the transitions from work to early retirement (via the so-called post-employment wage) and to an old age pension. For the United Kingdom, Meghir and Whitehouse (1997) suggested that social security benefits had a negative effect on the rate of return back to work, while wage earnings had a negative effect in the transition out of work and a positive effect on the rate of return back to work. Takayama (1992) pointed out a strong impact of pension benefits on the retirement decision in Japan.

59. The calculation of the option value at each retirement age requires information on: the age-related pension levels, the earnings over the past and potential future years of work for each individual, the marginal utility of leisure, the conditional survival rates and the discount rate. While pension levels and the age-profile of earnings can be estimated with a certain degree of confidence, the last three indicators can only be approximated and may lead to imprecise empirical results.

60. These results for the option value are consistent with those obtained by Börsch-Supan (1992 and 1994) for Germany using the same database (i.e. the German Socio-Economic Panel) but different econometric approaches.

nature, country-specific. Moreover, they focus on a shorter period of time (mid- to late-eighties and early nineties) and therefore cannot fully account for the marked changes in the pension systems over the seventies and early eighties.

- ***A proportional reduction of pension benefits***. The German and the Italian public pension system are relatively generous, with an average replacement rate at the standard age of entitlement to pension of 55 per cent (more than 70 per cent if calculated net of taxes) and 80 per cent, respectively. Both country-studies simulate a proportional reduction of 20 per cent in the pension levels, without any change in the age-profile of benefits. These microsimulations suggest only modest increases in the average age of retirement of male workers[61]. For Germany the average age increases by 1.3 per cent (from 62.6 years of age to 63.4), while in Italy there is an even smaller increase of about 0.7 per cent (from 58.5 years of age to 58.9). A reduction in the early retirement benefits in the Netherlands has not proved to be effective in raising participation rates. As stressed above, eligibility for employer-based early retirement schemes is the crucial variable in the Netherlands and even a significant reduction in the benefit levels (say by 20 per cent) would not change their attractiveness compared to other benefits (disability benefits and unemployment benefits).

- ***Eliminating the incentives for early retirement.*** The German study also simulated the effects on the average retirement age of a reform aimed at eliminating the incentives for early retirement. The age-profile of the pension benefits was adjusted so as to keep the net present value of the pension wealth constant across all retirement ages between 60 and 70. The results suggest a significant shift in the age profile of retirement, with the average retirement age rising by about one year and participation rates of older workers going up markedly.

- ***Postponing the eligibility for early retirement***. As discussed above, the Netherlands has a very generous employer-based early retirement scheme which significantly affects the retirement decision. Thus, the Dutch study simulated the effects of a postponement of the minimum age for early retirement of two years[62]. The participation rate of older workers increases markedly[63], but many people will move into retirement via the alternative routes, disability retirement and unemployment retirement. This underlines the importance of co-ordinating reforms of the different non-employment benefits. Since these schemes act as a substitutes in some countries, reforming one of them may not lead to significant effects on labour supply without reforming also the other schemes.

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61. Pelé and Ralle (1997) analyse the potential effects of the 1993 reform in France which, among other things, lengthened the minimum contribution years and widened the period considered for the calculation of the reference wage in the pension formula. According to the authors, the reform should result in a reduction of the reference wage of about 10 per cent with a consequent decline in pension levels. The authors estimate that this will lead to a rightward shift in the hazard function, with fewer withdrawals from the labour market at the age of 60 and more towards 65 years of age.

62. Early retirement benefits are available to older workers, in some cases, as early as 52 years of age with the highest incidence from 57 onwards.

63. At the age of 60, participation rates would increase by about 12 percentage points (from 33.3 per cent to 45.1) and at the age of 62 by about 11 percentage points (from 15.5 per cent to 26.6 per cent).

– ***Postponing the access to occupational pensions***. Workers with an occupational pension in the United Kingdom retire earlier than those without because occupational benefits are typically available at 55 years of age. The UK study estimated the impact on the average retirement age of reforming eligibility conditions for the occupational pension to conform with those of the social security system (65 years of age for men and 60 for women). The results suggest a shift in the average retirement age of more than one year for older men (from 62.6 years of age to 63.9).

V.5 Concluding remarks

119. The empirical evidence presented in this chapter suggests that economic incentives embedded in the pension system and in the other non-employment benefit schemes have a significant effect on the retirement behaviour of older workers. Pooled cross-country time series regressions suggest that the variation in participation rates across countries and time can be explained by various features of old-age public pension systems, including the replacement rates, the standard age of entitlement to pension, and the accrual rates. In addition, unemployment-related benefits contribute to reduce participation rates among older workers. Structural conditions in the labour market also influence the early withdrawal of older workers from the labour market due to discouragement effects. The empirical results from the pooled regressions have been used to run a policy simulation in which the pension systems are reformed to be actuarially neutral. It shows that such a move could have significant effects on participation rates of older workers, in some cases reverting a large part of the drop observed in the 1971-1995 period.

120. Microeconometric analysis confirms the importance of economic incentives for retirement decisions, but also highlights the role of various socio-economic variables. These latter play a different role depending on the retirement "route" chosen, i.e. early-retirement, disability retirement or unemployment retirement. The policy simulations reveal that reducing old-age pension benefits and especially postponing the access to early retirement will be effective in delaying the withdrawal of older workers from the labour market. Interactions between the different non-employment income support schemes are important, and reforms of one scheme that leave unchanged the others may not be effective.

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TABLES AND FIGURES

Table II.1 **Estimates of the average age of transition to inactivity among older workers**

	Males						
	1950	1960	1970	1980	1990	1995	Decrease 1995-60
Australia	66.0	66.1	65.0	62.7	62.4	61.8	-4.3
Austria	66.4	63.9	62.7	60.1	58.7	58.6	-5.3
Belgium	64.8	63.3	62.6	61.1	58.3	57.6	-5.6
Canada	66.7	66.2	65.0	63.8	62.8	62.3	-3.9
Denmark	67.1	66.7	66.3	64.5	63.3	62.7	-4.0
Finland	66.8	65.1	62.7	60.1	59.6	59.0	-6.1
France	66.1	64.5	63.5	61.3	59.6	59.2	-5.3
Germany	65.7	65.2	65.3	62.2	60.3	60.5	-4.7
Greece	68.2	66.5	65.6	64.9	62.3	62.3	-4.2
Iceland	68.9	68.8	66.7	69.3	68.9	69.5	0.7
Ireland	68.3	68.1	67.5	66.2	64.0	63.4	-4.8
Italy	66.9	64.5	62.6	61.6	60.9	60.6	-3.8
Japan	66.7	67.2	67.7	67.2	66.5	66.5	-0.7
Luxembourg	65.8	63.7	62.5	59.0	57.6	58.4	-5.2
Netherlands	66.4	66.1	63.8	61.4	59.3	58.8	-7.3
New Zealand	64.8	65.1	64.7	62.9	62.2	62.0	-3.1
Norway	67.6	67.0	66.5	66.0	64.6	63.8	-3.2
Portugal	67.8	67.5	67.2	64.7	63.9	63.6	-4.0
Spain	68.1	67.9	65.2	63.4	61.6	61.4	-6.5
Sweden	66.8	66.0	65.3	64.6	63.9	63.3	-2.7
Switzerlands	67.7	67.3	66.7	65.5	64.8	64.6	-2.7
Turkey	69.1	68.7	68.0	64.9	63.5	63.6	-5.2
United Kingdom	67.2	66.2	65.4	64.6	63.2	62.7	-3.5
United States	66.9	66.5	65.4	64.2	64.1	63.6	-2.9

	Females						
	1950	1960	1970	1980	1990	1995	Decrease 1995-60
Australia	63.6	62.4	60.3	58.2	57.6	57.2	-5.2
Austria	64.7	61.9	60.6	59.3	56.7	56.5	-5.4
Belgium	62.9	60.8	59.1	57.5	54.7	54.1	-6.7
Canada	61.2	64.3	63.0	60.5	59.3	58.8	-5.5
Denmark	63.0	64.6	62.0	61.0	59.9	59.4	-5.2
Finland	64.7	63.2	60.6	59.6	59.4	58.9	-4.3
France	69.0	65.8	64.0	60.9	59.0	58.3	-7.5
Germany	62.7	62.3	62.2	60.7	58.2	58.4	-3.9
Greece	64.3	64.4	64.3	62.5	60.6	60.3	-4.1
Iceland	..	..	69.6	65.8	66.4	66.0	..
Ireland	68.7	70.8	69.8	66.0	61.8	60.1	-10.7
Italy	64.0	62.0	60.7	59.5	57.5	57.2	-4.8
Japan	65.5	64.6	64.6	63.9	63.9	63.7	-0.9
Luxembourg	64.8	63.8	62.3	60.8	56.0	55.4	-8.4
Netherlands	64.1	63.7	62.9	58.4	55.8	55.3	-8.4
New Zealand	61.2	62.5	60.9	58.7	59.2	58.6	-4.0
Norway	69.0	70.8	66.2	61.5	63.0	62.0	-8.8
Portugal	68.5	68.1	65.3	62.9	61.0	60.8	-7.3
Spain	68.9	68.0	64.7	63.6	59.7	58.9	-9.1
Sweden	65.4	63.4	62.5	62.0	62.4	62.1	-1.3
Switzerlands	67.2	66.9	65.4	62.4	61.1	60.6	-6.3
Turkey	70.2	69.2	68.3	67.6	68.3	66.6	-2.6
United Kingdom	63.9	62.7	62.4	62.0	60.5	59.7	-3.0
United States	64.2	65.1	64.8	62.8	62.2	61.6	-3.5

Notes:
The calculation of the average retirement age is based on aggregate data on active and total population by gender by quinquennial age groups. The mathematical derivation of the retirement ages is from Latulippe (1996). Accordingly, there are a number of assumptions concerning the distributions of the population and retirement wit each age group: i) minimum retirement age is set at 45 years of age; ii) within each age group, the population is assumed to be normally distributed; and iii) retirement within each age group is assumed to be linear with age.

The retirement distribution of the whole population is estimated on the basis of the retirement distribution within e age group. This requires information on the expected age of retirement for each age group and the proportion of t population in that group expected to retire over five years. The former is set equal to *x+5*, where *x* is the age of th last birthday, under the assumption of a symmetric probability distribution of retirement on *x,x+9*. The proportio people expected to retire in each age group is estimates as follows:

$$R^{y}_{x,x+4} = \left(A^{y}_{x,x+4} - A^{y}_{x+5,x+9}\right) \cdot P^{y}_{x,x+4}$$

where:

$R^{y}_{x,x+4}$ = number of people aged from *x* to *x+4* at mid-year *y* who retire within five years;
x = age of last birthday;
y = calendar year;
$P^{y}_{x,x+4}$ = number of individual alive at the middle of the calendar year *y* who are aged from *x* to *x+4*;
$A^{y}_{x,x+4}$ = average participation rates of people aged from *x* to *x+4* at mid-year *y*.

For the age group 65 and over, the probability is calculated as follows:

$$R^{y}_{65+} = R^{y}_{65,69} = \left(A^{y}_{65+} \cdot P^{y}_{65+}\right)$$

Thus, the average retirement age for the whole population is defined as:

$$RA = \frac{0.5 \cdot R^{y}_{40,44} \cdot 46.7 + \sum_{x=45,50...}^{65} R^{y}_{x,x+4} \cdot (x+5)}{0.5 \cdot R^{y}_{40,44} + \sum_{x=45,50...}^{65} R^{y}_{x,x+4}}$$

Source: Economically Active Population 1950-2010, ILO (December 1996), Latulippe, D. (1996), *Effe Retirement Age and Duration of Retirement in the Industrial Countries between 1950-1990,* ILO, Genève.

Table II.2 **Retired males aged 55-64 [1]: Main reasons for leaving last job or business, 1995**
(Share of total)

	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Sweden	Switzerland [3]	United Kingdom
Dismissed or made redundant	5.1	3.7	23.4	24.1	10.7	9.5	2.5	8.8	2.0	0.0	7.9	1.0	10.2	30.2	4.9	22.0
A job of limited duration has ended	0.2	0.7	7.0	3.8	1.5	0.7	1.7	3.1	1.7	0.5	0.1	0.4	11.1	8.2	..	3.6
Personal or family responsibilities	0.2	1.3	0.2	0.0	0.4	0.6	0.5	1.4	1.2	0.2	1.9	0.0	0.2	2.0	2.2	1.6
Own illness or disability	2.6	7.7	9.5	25.0	7.3	22.9	4.1	15.1	5.2	16.6	15.6	2.1	18.3	7.0	28.9	22.8
Early retirement	49.0	30.6	37.2	0.0	16.9	33.1	5.1	15.9	9.2	29.1	42.9	2.3	13.0	25.9	35.1	14.7
Normal reetirement	30.2	19.6	2.3	11.7	38.6	10.9	52.2	12.0	53.4	31.7	0.0	1.2	17.8	12.5	22.8	4.8
Other reasons [2]	12.8	36.4	20.3	35.5	24.5	22.3	33.9	43.7	27.5	22.0	31.6	93.1	29.5	14.2	6.1	30.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note:
1. Refers to persons aged 55-64 who are not in the labour force, but who had been in the labour force in the 8 years preceeding the survey.
2. Other reasons include: education and training, compulsory military or community service and other reasons.
3. 1996.

Source: The European Union Labour Force Survey, 1995; and Swiss Labour Force Survey 1996.

Table II.3 **The incidence of displacement by age** [1]
(per cent)

	16-24	25-34	34-49	50-64
United States (1991-92) [2]	2.0	3.8	3.9	4.3
Germany (1994)	7.3	5.1	4.8	5.3
United Kingdom (1994)	3.9	2.4	3.6	4.1
Spain (1994)	2.8	2.0	1.9	2.0

Notes:
1. The incidence rate is derived from microeconomic datasets. It is defined as the number of displayed workers relative to the total number of workers.
2. The age groups for the United States are 20-24, 25-34, 35-54, 55 and over.

Source:
P. Antolin (forthcoming), A study on displaced workers, Economics Department Working Paper, OECD.

Table II.4 **Male workers aged 55-64: Highest completed level of higher education or vocational training, 1995**
(Per cent of group total)

		No further education	Vocational education	Third level education	Other
Austria	Employed	..	29.6	73.4	32.5
	Unemployed	..	21.7	2.0	20.6
	Retired	..	48.7	24.6	46.9
		..	100.0	100.0	100.0
Belgium	Employed	27.3	36.5	56.8	..
	Unemployed	19.3	5.9	6.3	..
	Retired	53.4	57.6	36.9	..
		100.0	100.0	100.0	..
Denmark	Employed	34.1	40.5	53.3	..
	Unemployed	33.4	35.4	31.7	..
	Retired	32.5	24.1	15.1	..
		100.0	100.0	100.0	..
Finland	Employed	15.6	21.9	45.5	..
	Unemployed	49.4	34.4	24.3	..
	Retired	35.0	43.6	30.2	..
		100.0	100.0	100.0	..
France	Employed	20.6	29.5	37.1	100.0
	Unemployed	28.3	23.0	34.0	0.0
	Retired	51.1	47.6	28.9	0.0
		100.0	100.0	100.0	100.0
Germany	Employed	18.1	24.9	38.2	19.0
	Unemployed	52.7	46.6	40.1	48.4
	Retired	29.2	28.5	21.6	32.5
		100.0	100.0	100.0	100.0
Greece	Employed	44.0	35.5	46.3	..
	Unemployed	26.4	25.8	18.3	..
	Retired	29.6	38.6	35.4	..
		100.0	100.0	100.0	..
Ireland	Employed	..	..	59.2	32.0
	Unemployed	..	..	22.3	45.9
	Retired	..	..	18.6	22.1
		..	..	100.0	100.0
Italy	Employed	30.0	36.8	75.5	..
	Unemployed	25.2	15.7	2.3	..
	Retired	44.7	47.4	22.2	..
		100.0	100.0	100.0	..
Luxembourg	Employed	25.5	37.5	71.6	..
	Unemployed	0.0	0.0	0.0	..
	Retired	74.5	62.5	28.4	..
		100.0	100.0	100.0	..
Netherlands	Employed	23.5	34.1	43.8	17.9
	Unemployed	19.7	17.8	15.4	0.0
	Retired	56.8	48.2	40.8	82.1
		100.0	100.0	100.0	100.0
Portugal	Employed	39.4	40.6	57.6	79.3
	Unemployed	32.4	19.5	21.6	0.0
	Retired	28.2	40.0	20.8	20.7
		100.0	100.0	100.0	100.0
Spain	Employed	21.3	22.6	44.0	..
	Unemployed	53.8	50.6	34.3	..
	Retired	24.9	26.9	21.6	..
		100.0	100.0	100.0	..
Sweden	Employed	43.1	51.7	..	0.0
	Unemployed	49.4	39.4	..	0.0
	Retired	7.5	8.9	..	100.0
		100.0	100.0	..	100.0
UK	Employed	23.3	29.5	36.7	36.6
	Unemployed	52.6	50.0	41.9	29.6
	Retired	24.1	20.6	21.4	33.8
		100.0	100.0	100.0	100.0

Source: The European Union Labour Force Survey, 1995.

Table II.5 **Employed and retired males aged 55-64: Sectoral breakdown, 1995.**
(per cent of total)

		Agriculture, hunting & fishing	Mining and quarrying	Manufacturing	Electricity gas & water	Construction	Wholesale and retail trade	Hotels & restaurants	Transport storage & communication	Financial intermediation	Real estate, renting	Public administration	Other	Total [1]
Austria	Employed	19.1	0.2	23.9	1.7	10.2	9.1	1.8	6.9	3.3	3.8	7.5	12.4	100.0
	Retired	12.1	2.0	30.3	1.5	18.3	7.6	0.9	12.2	1.7	0.9	7.4	5.0	100.0
Belgium	Employed	8.3	0.6	15.9	1.9	8.5	16.8	2.1	8.5	3.6	6.1	11.5	16.4	100.0
	Retired	2.0	1.4	37.2	1.4	11.2	11.2	1.1	10.4	3.6	1.8	9.8	8.9	100.0
Denmark	Employed	8.5	0.1	20.3	2.1	9.7	13.8	0.3	10.2	2.3	8.4	6.8	17.5	100.0
	Retired	2.6	0.0	28.4	2.3	12.8	12.4	2.5	11.1	1.9	1.8	7.7	16.6	100.0
Finland	Employed	21.5	0.2	22.6	1.6	6.5	9.4	0.2	8.5	1.3	8.4	4.3	15.5	100.0
	Retired	11.6	0.0	30.0	2.3	16.3	12.0	0.0	8.9	0.8	4.8	4.9	8.4	100.0
France	Employed	11.5	0.4	20.9	0.6	12.3	12.0	3.0	5.7	2.5	8.2	7.5	15.5	100.0
	Retired	10.2	1.5	31.8	2.0	13.4	8.7	1.6	10.5	1.9	3.5	7.5	7.2	100.0
Germany	Employed	5.4	0.6	28.4	1.7	12.6	10.9	1.6	7.5	2.9	5.5	10.7	12.2	100.0
	Retired	6.3	3.7	41.8	1.9	11.5	7.4	0.7	8.3	1.5	2.6	8.4	5.8	100.0
Greece	Employed	36.2	0.5	13.2	0.7	8.2	13.3	3.7	7.6	0.8	2.8	4.9	8.1	100.0
	Retired	7.6	1.3	20.4	3.7	16.2	9.5	2.8	17.6	1.6	1.3	10.4	7.6	100.0
Ireland	Employed	29.0	0.7	13.6	1.7	9.7	11.3	2.8	5.8	1.6	4.6	5.1	14.0	100.0
	Retired	11.1	2.0	21.8	2.4	16.2	9.8	2.5	10.9	3.4	3.5	7.6	8.7	100.0
Italy	Employed	14.9	0.4	15.3	1.1	12.3	18.4	3.0	7.5	3.2	3.9	7.4	12.7	100.0
	Retired	11.1	0.9	33.2	1.6	12.4	8.8	1.7	9.5	2.5	1.5	9.4	7.5	100.0
Luxembourg	Employed	7.6	0.0	17.6	1.1	7.4	12.9	1.4	7.7	7.2	3.2	11.4	22.6	100.0
	Retired	4.0	0.4	42.3	0.8	11.5	9.8	0.2	11.4	3.4	0.8	8.3	7.1	100.0
Netherlands	Employed	11.2	0.0	20.0	0.9	7.8	14.8	1.4	6.8	3.4	8.8	8.4	16.5	100.0
	Retired	2.1	0.7	24.6	0.6	9.1	15.9	3.6	7.3	2.5	8.6	8.5	16.5	100.0
Portugal	Employed	21.8	0.3	16.5	1.4	10.6	18.3	3.3	6.6	3.0	2.7	6.9	8.6	100.0
	Retired	9.6	1.6	19.1	0.4	13.8	11.1	0.8	20.0	5.1	2.1	13.6	3.0	100.0
Spain	Employed	20.0	0.4	20.6	1.4	9.9	13.6	4.0	9.0	1.4	2.2	7.0	10.5	100.0
	Retired	17.1	1.9	31.9	0.7	18.4	7.7	2.9	7.8	2.6	1.2	5.0	2.9	100.0
Sweden	Employed	7.4	0.0	28.7	1.2	11.1	12.2	0.9	8.6	1.3	10.0	5.9	12.8	100.0
	Retired	..	..	..	..	..	..	..	..	..	..	..	..	..
UK	Employed	4.2	0.5	25.7	0.9	12.0	13.0	2.4	8.9	2.2	9.9	4.3	16.0	100.0
	Retired	1.9	2.5	27.6	3.5	14.4	7.7	2.5	11.4	3.6	5.3	6.8	12.9	100.0

1. Retired persons not answering the question about sectoral affiliation in the last job are not included in the total.

Source: The European Union Labour Force Survey, 1995.

Table II.6 **Employed and retired males aged 55-64: Distribution by professional status, 1995**
(Per cent of total)

		Self-employed	Employees	Family worker
Austria	Employed	24.7	67.8	7.4
	Retired	13.5	85.4	1.1
Belgium	Employed	35.3	64.1	0.6
	Retired	10.1	89.9	0.0
Denmark	Employed	24.3	75.7	0.0
	Retired	13.8	86.2	0.0
Finland	Employed	34.3	61.1	4.5
	Retired	14.4	85.6	0.0
France	Employed	29.3	68.3	2.5
	Retired	9.9	89.2	0.9
Germany	Employed	18.4	81.0	0.6
	Retired	4.3	95.7	0.1
Greece	Employed	65.7	33.3	1.0
	Retired	22.9	76.9	0.2
Ireland	Employed	46.4	53.1	0.5
	Retired	18.0	82.0	0.0
Italy	Employed	45.9	52.3	1.8
	Retired	17.3	81.6	1.1
Luxembourg	Employed	20.7	78.2	1.1
	Retired	9.5	90.5	0.0
Netherlands	Employed	31.1	68.3	0.6
	Retired	5.9	92.9	1.3
Portugal	Employed	45.9	53.5	0.6
	Retired	7.6	92.4	0.0
Spain	Employed	39.4	59.3	1.3
	Retired	12.9	86.9	0.2
Sweden	Employed	19.5	80.4	0.1
	Retired	4.9	95.1	0.0
United Kingdom	Employed	25.2	74.3	0.6
	Retired	11.8	88.2	0.0

Source: The European Union Labour Force Survey, 1995.

Table III.1 **Standard age of entitlement to public old-age pensions**

	Males			Females		
	1961	1975	1995	1961	1975	1995
Australia	65	65	65	60	60	60
Austria	65	65	65	60	60	60
Belgium	65	65	65	60	60	60
Canada	70	65	65	70	65	65
Czech Republic			60			57
Denmark	67	67	67	67	67	67
Finland	65	65	65	65	65	65
France	65	65	60	65	65	60
Germany	65	65	65	65	65	65
Greece	65	62	62	60	57	57
Hungary			60			56
Iceland	67	67	67	67	67	67
Ireland	70	68	66	70	68	66
Italy	60	60	62	55	55	57
Japan	60	60	60	55	55	58
Korea			60			60
Luxembourg	65	65	65	65	60	65
Mexico			65			65
Netherlands	65	65	65	65	65	65
New Zealand	65	65	62	65	65	62
Norway	70	67	67	70	67	67
Poland			65			60
Portugal	65	65	65	65	62	62.5
Spain	65	65	65	65	65	65
Sweden	67	67	65	67	67	65
Switzerland	65	65	65	63	62	62
Turkey			60			55
United Kingdom	65	65	65	60	60	60
United States	65	65	65	65	65	65

Source: U.S. Department of Health and Human Services, *Social Security Programs Throughout the World,* various issues.

Table III.2 **Old-age pensions after the standard entitlement age: Earnings disregards and benefit reduction rates [1] , 1995**

Single workers

	Earnings disregard (% of average earnings [2])	Benefit reduction rate (BRR)	
Australia	7.5	50	
Austria	29.8		Does not apply if years of contributions exceed 35.
Belgium	28.7		Over the 28.7-33% earnings range, one per cent increase in earnings results in one per cent reduction in benefits.
	33.0	susp. [3]	
Canada	160.0	15	Applies only to the Old Age Security (OAS) system.
Denmark	50.0	60	Only up to age 70. For means tested pension supplements, the disregard is 17.7%, and the BRR is 30%.
Finland	-	-	
France	-	-	
Germany	-	-	
Greece	116.1	susp. [3]	
Iceland	58.9	25	For supplementary pensions, the disregard is 15.6% and the BRR is 45%.
Ireland	-	-	Retirement pensions are conditionnal on withdrawal from work.
Italy	22.5	100	The earnings disregard is increased to 51.3% if earnings come from self-employment.
Japan	17.0	(20)	Up to 90% of average earnings: 20 % reduction in level of pensions. Only up to 64.
	90.0	susp. [3]	
Netherlands	-	-	
New Zealand	-	-	
Norway	18.0	50	Only up to age 70.
Portugal	-	-	Pension payment are conditional on withdrawal from work.
Spain	-	-	Pension payment are conditional on withdrawal from work.
Sweden	-	-	
Switzerland	-	-	
United Kingdom	-	-	
United States	38.4	33	Only up to age 70.

Notes:

1. "-" denotes that pensions are not reduced with higher earnings.
2. Average earnings as defined in the OECD unemployment benefit database.
3. "susp." denotes that pensions are suspended if earnings are above the earnings disregard.

Source : U.S. Department of Health and Human Services, *Social Security Programs Throughout the World* , 1995 issue; Commission of the European Communities, *MISSOC - Social Protection in the Member States of the Community* . Situation on 1 July 1995 and evolution; OECD (1996), *Economic Surveys - Canada.*

Table III.3 **Expected old-age pension gross replacement rates: Synthetic indicator** [1]
(per cent)

	1961	1975	1995
Australia	19.1	32.8	40.9
Austria	79.5	79.5	79.5
Belgium	72.6	70.5	67.5
Canada	31.3	45.1	51.6
Czech Republic			53.2
Denmark	35.9	42.3	56.2
Finland	34.9	58.6	60.0
France	50.0	62.5	64.8
Germany	60.2	59.6	55.0
Greece			120.0
Hungary			54.6
Iceland			93.0
Ireland	38.6	28.9	39.7
Italy	60.0	62.0	80.0
Japan	24.6	54.1	52.1
Luxembourg			93.2
Netherlands	32.2	48.0	45.8
New Zealand	32.0	43.0	61.3
Norway	25.3	61.2	60.0
Poland			53.7
Portugal	85.0	77.0	82.6
Spain		50.0	100.0
Sweden	53.8	77.1	74.4
Switzerland	28.4	51.7	49.3
United Kingdom	33.4	33.8	49.8
United States	39.1	49.1	56.0
Average of above countries [2]	44.0	54.6	59.3

Notes:

1. The figures refer to theoretical replacement rates and are based on assumptions listed in Box III.1. Figures for the four individual cases making up the synthetic indicator are reported in Table A.7.
2. The average for 1995 refers only to countries for which data are available for the whole period covered in the table.

Source:

Secretariat calculations based on pension legislation as described in U.S. Department of Health and Human Services, *Social Security Programs Around the World* , (various issues); Commission of the European Communities, *Social Protection in the Member States of the Community;* national sources.

Table III.4 **Increase in old-age pensions for a 55 year-old male by working for 10 more years**
percentage point increase in the synthetic replacement rate

	1967	1995
Australia	0	0
Austria	13	12
Belgium	32	15
Canada	23	0
Czech Republic		1
Denmark	2	1
Finland	10	4
France	25	17
Germany	13	11
Greece		25
Hungary		1
Iceland		10
Ireland	0	0
Italy	24	10
Japan	5	3
Luxembourg		19
Netherlands	0	0
New Zealand	0	0
Norway	17	9
Poland		9
Portugal	15	10
Spain	0	0
Sweden	21	0
Switzerland	12	11
United Kingdom	0	10
United States	0	0

Note:
It is assumed that the individual started work at the age of 20 so that he has a potential contribution period of 35 years at the age of 55.

Source:
Same as for Table III.3.

Table III.5 **Flexible pension systems: Main characteristics, 1995**

	Standard age	Earliest age	Final age	Pension adjustment per cent per month
United States	65	62	70	0.5
Japan [1]	60	-	70	-
Germany	65	63	67	0.5
United Kingdom	65	65	70	0.6
Canada	65	60	70	0.5
Czech Republic	60	60	70	0.33
Finland	65	60	70	0.5-1.0
Greece	65	60	65	0.5
Hungary	60	60	70	0.25
Spain	65	60	65	0.66
Sweden	65	60	70	0.5-0.7

Note:

1. Only possible for the fixed part of employees pension. Deferral of one year after the age of 65 increases this component by 12 per cent, two years give a 26 per cent increase, three years 43 per cent, four years 64 per cent and five years 88 per cent.

Source:

U.S Department of Health and Human Services, *Social Security Programs Throughout the World,* 1995 issue; Börsh-Supan and Schnabel (1997); Blundell and Johnson (1997).

Table III.6 **Cumulated pension wealth accruals for singles on average wages [1], 1967 and 1995**
(relative to annual earnings)

	Postponing retirement from 55 to 64		Postponing retirement from 55 to 69	
	1967	1995	1967	1995
United States	-0.8	-1.2	-1.9	-2.5
Japan	-1	-2.8	-2.1	-3.9
Germany	-0.4	-1.4	-2.9	-3.4
France	-0.2	-1.4	-1.2	-3.7
Italy	-3	-7.9	-4.5	-11.8
United Kingdom	-0.6	-0.5	-1.4	-1.5
Canada	1.5	-0.6	-0.1	-1.6
Australia	0	0	-0.8	-0.9
Austria	-3.1	-3.4	-6.5	-7
Belgium	0.2	-2.3	-2.3	-5
Denmark	0	0	-0.6	-0.8
Finland	0	-2.2	-1.3	-4.9
Ireland	-0.5	-1.4	-0.6	-2.6
Netherlands	-0.9	-1.3	-2.3	-2.9
New Zealand	0	-0.9	-0.5	-2.3
Norway	-0.3	-1.5	-0.3	-3.3
Portugal	-0.5	-0.4	-3.8	-3.7
Spain	..	-1.4	..	-5.9
Sweden	0.9	-1.8	0	-3.3
Switzerland	0.2	0	-0.7	-1.5

Note:

1. The figures show changes in the pension wealth measured as a multiple of annual earnings. For example, postponing retirement from 55 to 64 in the United States in 1967 implied that the pension wealth decreased by an equivalent of 0.8 times average annual earnings. As annual earnings are assumed to be constant and normalised at unity, this is equivalent to an average implicit tax rate of 8 per cent (i.e. 0.8/10).

Source: Calculations based on data reported in Table A.8.

Table IV.1 **Male recipients aged 55-64 of non-employment**
(per cent of male population aged 55-64)

	Invalidity pensions (1990)	Unemployment pensions	Special early-retirement pensions
United States	9.4	0	0
Japan		0	0
Germany	16.9	7.8 [1]	0
France	-	0	2.7 [1]
Italy	16.8		
United Kingdom	15.5	0	0
Canada	7.1	0	0
Australia	16.4	5.7	0
Austria	57.7	0.8 [2]	
Belgium	10.5	0	12.3 [3]
Denmark	15.3	2.1 [4]	25.2 [5]
Finland	40.2 [2]	8.3 [2]	0
Ireland	8.9		
Netherlands	27.4	0	0 [6]
Norway	33.5	0	
Spain	16.7	14.2	0
Sweden	24.9	0	0

Notes:
"-" denotes that the proportion is unknown.
1. 1994
2. 1992
3. 1989
4. Refers to males aged 50-59 as a per cent of male population aged 50-
5. 1995
6. Netherlands has a voluntary early-retirement scheme.

Source: OECD (1995*a*); *Ministerie van Sociale Zaken* (1997); national sources.

Table IV.2 **Non-employment benefit schemes: Summary generosity indicators for aged workers, 1995**
Replacement ratio

	Disability schemes	Unemployment schemes	Special ER schemes
Australia	0.273	0.269	0
Austria	0.681	0.489	0.681
Belgium	0.583	0.389	0.748
Canada	0.331	0.179	0
Czech Republic	0.224	0.056	0
Denmark	0.388	0.715	0
Finland	0.600	0.641	0
France	0.250	0.230	0.325
Germany	0.441	0.394	0
Hungary	0.279	0.186	0
Iceland	0.390	0.419	0
Ireland	0.322	0.240	0
Italy	0.360	0.500	0.700
Japan	0.251	0.030	0
Luxembourg	0.529	0.776	0.240
Netherlands	0.700	0.525	0.400
Norway	0.570	0.172	0
New Zealand	0.252	0.240	0
Poland	0.469	0.162	0
Portugal	0.717	0.616	0
Spain	0.715	0.371	0
Sweden	0.696	0.144	0
Switzerland	0.434	0.107	0
United Kingdom	0.275	0.169	0
United States	0.448	0.064	0

Note:
The definition of the synthetic replacement rate is given in Box IV.1. The replacement rate is the average for the 55-64 age span; so that where old-age pensions become available earlier than at 65, this shows up in a lower rate.

Source: OECD

Table IV.3 **Generosity of disability and unemployment schemes: Evolution over time**
Replacement ratio

	Disability schemes			Unemployment schemes		
	1961	1975	1995	1961	1975	1995
Australia	0.127	0.219	0.275	0.175	0.219	0.269
Austria	0.537	0.645	0.681	0.287	0.462	0.489
Belgium	0.479	0.507	0.583	0.425	0.446	0.389
Canada	0.139	0.239	0.331	0.154	0.167	0.179
Denmark	0.240	0.327	0.388	0.179	0.350	0.715
Finland	0.219	0.530	0.600	0.016	0.383	0.641
France	0.500	0.500	(0.250)	0.167	0.439	(0.230)
Germany	0.482	0.490	0.441	0.412	0.409	0.394
Ireland	0.281	0.254	0.322	0.014	0.165	0.240
Italy	(0.222)	(0.555)	(0.600)	(0.137)	(0.286)	(0.740)
Japan	(0.058)	(0.194)	(0.251)	(0.035)	(0.040)	(0.030)
Netherlands	0.656	0.800	0.700	0.028	0.390	0.525
Norway	0.219	0.605	0.570	0.020	0.038	0.172
New Zealand	0.214	0.287	(0.252)	0.424	0.284	(0.240)
Portugal	0.700	0.747	0.717	0	0.016	0.616
Spain		0.550	0.715		0.422	0.371
Sweden	0.632	0.771	0.744	0.025	0.140	0.144
Switzerland	0.247	0.462	0.434	0.018	0.020	0.107
United Kingdom	0.308	0.332	0.275	0.219	0.181	0.169
United States	0.313	0.393	0.448	0.021	0.076	0.064
Unweighted average (only countries with ret.age 65 or higher)	0.364	0.487	0.495	0.112	0.215	0.337

Note:
Figures in parentheses denote that the retirement age is lower than 65, which affect the calculations.

Source: OECD

Table IV.4 **Unemployment-related benefits for older workers: Entitlement conditions**

	Unemployment benefits	Unemployment pensions
Germany	1986: 58+, active job-search not required.	1972: 60+, unemployed 1 year in last 18 months, and 15 years of contributions.
France	56+, no requirements to seek a job or to participate in ALMPs	
Italy		1979: 57+ (males) and 52+ (females) 1983: 55+ (males) and 50+ (females), if unemployment due to severe economic conditions or industrial organisation.
United Kingdom	1983: 60+ (males) and 55 (females), exemption from job-seeking requirements.	
Australia	1990: 55+, exemption from requirements to seek a full-time job, if engaged in or seeking substantial part-time work.	1994: 60+, "mature age allowance".
Austria		Prior to 1961: 60+ (males) and 55+ (females), 1 year of unemployment.
Belgium	1985: 55+, exemption from job-seeking requirements	
Denmark	50+, exemptions from job-seeking requirements and participation in ALMPs, but a job offer must be accepted.	1979: 60+, available to both the unemployed (benefits stop at 59) and the employed. 1992-1996: 50+, available to members of unemployment insurance funds aged between 50 and 59, and unemployed for more than a year.
Finland		1972: 60+, unemployed at least 500 days during last 60 weeks and covered for at least 5 of the last 15 years.
Ireland		1995: 55+, unemployed for 15 or more months.
New Zealand	1992: 55+, relaxed work test.	
Portugal		1973: 60+, exhaustion of unemployment benefits.

Source: OECD 1995a, U.S. Department of Health and Human Services, *Social security Programs Throughout the World,* various issues, national sources.

Table IV.5. **Labour-market criteria in disability systems**

Australia	May-81	Factors such as changes in the labour market to be taken into account.
	Jul-87	Greater emphasis on labour market conditions.
	Oct-91	New Disability Support Pension: only a limited range of non-medical factors are taken into account.
Austria	1980/81	One of the groups becoming eligible: long-term unemployed aged 56 and over.
Finland	1973	Labour market conditions introduced as one of elements when deciding on award.
	1986 (1989 in)	Early disability pension for those aged 55+. Criterion: whether the claimants' last work can
	in public sector	still be held to be suitable to him/her, rather than whether any other work would be suitable.
Germany	1969	Criterion: whether there is any work available that the disabled person could do.
Italy	1970	Local socio-economic situation must be assessed in determining the award of invalidity pensions.
Netherlands	1972 to 1987	Granting of awards took account of labour market conditions. Thus, a person who was partially disabled could be classified as totally disabled if it was considered that he/she would be unable to find suitable work in the local labour market.
Sweden	1970	For those aged 62 and over, labour market chances were taken into account.
	Mid-1972	For older workers, labour market conditions could be the sole reason for awarding
	to 1991	invalidity benefit. Those aged 62+ (60+ from July 1976) could claim benefit if they had exhausted their entitlements to unemployment benefit (after 450 days).

Source: OECD (1995*a* and *b*).

Table IV.6 **Benefit systems for the elderly: Impact on social security wealth [1], 1995**
(Cumulative change in wealth relative to earnings from postponing retirement from 55 to 70)

	Old-age pension system	Unemployment-related benefits [2]	Disability benefits [2]	Special early-retirement [3]
United States	-2.5	-	-	-
Japan	-3.9	-	-	-
Germany	-3.4	-5.7	-6.6	-
France	-6.3	-7.2	-	-8.7
Italy	-11.8	- [4]	- [4]	- [4]
United Kingdom	-1.5	-2.6	-3.7	-
Canada	-1.6	-	-	-
Australia	-0.9	-	-3.0	-
Austria	-7.0	-7.0	-10.0	-
Belgium	-5.0	-6.4	-7.1	-8.3
Denmark	-0.8	-6.6	-5.0	-3.7
Finland	-4.9	-7.1	-9.9	-
Ireland	-2.6	-4.6	-4.6	-
Luxembourg	-6.2	-9.7	-9.5	-8.4
Netherlands	-2.9	-7.3	-5.7	- [5]
New Zealand	-2.3	-4.0	-4.1	-
Norway	-3.3	-	-9.2	-4.3
Portugal	-3.7	-6.6	-9.9	-
Spain	-5.9	-7.8	-9.8	-
Sweden	-3.3	-	-10.6	-
Switzerland	-1.5	-	-	-

Notes:

1. The change in the social security wealth is calculated according to the formula in Box III.2. When the retirement age is lower than the earliest age at which pensions become available, the pension replacement rate is set at zero in the calculations for old-age pensions alone. However in the case of the non-employment benefit schemes, it is set at the replacement rate in these scheme as from the earliest age at which such benefits are available. For disability benefits, it is assumed that benefits can be obtained as from the age of 55; for special early retirement schemes, the age limit is set in legislation; and for unemployment-related benefits, it is assumed that they become available at the age of entitlement to unemployment pension or at the age at which the active job search requirement is relaxed, or at the age at which unemployment benefits can be obtaind until the pension age under special extension arrangements.
2. "-" denotes that early retirement into the non-employment benefit systems is not an option because of entitlement conditions.
3. "-" denotes that there are no public schemes or that such schemes are not much used.
4. Existing schemes are not relevant for a worker with a long contribution history as he can obtain benefits from the old-age pension system.
5. Special early retirement schemes in the Netherlands are not mandatory.

Source: OECD.

Table V.1 **Labour market and institutional variables in the OECD countries: 1971-95**
(In per cent)

	Part. rate$_i$			UR			RPOP			UDENS			U repl			Er repl		
	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971
Australia	84.4	60.9	-23.5	0.8	6.9	6.1	59.1	64.7	5.6	50.2	35.0	-15.2	14.4	41.3	26.9	0.0	0.0	0.0
Canada	83.3	58.9	-24.4	5.2	8.6	3.4	57.3	67.3	10.0	31.5	38.0	6.5	16.7	17.9	1.2	0.0	0.0	0.0
Finland	73.2	46.0	-27.2	2.8	15.1	12.4	56.6	66.9	10.3	53.0	81.0	28.0	9.8	64.1	54.3	0.0	0.0	0.0
France	74.6	41.5	-33.0	1.1	8.8	7.7	58.9	64.2	5.2	21.8	9.0	-12.8	26.9	23.0	-3.9	0.0	32.5	32.5
Western Germany	78.5	57.8	-20.7	0.4	5.7	5.3	62.2	65.0	2.7	33.3	29.0	-4.3	40.4	39.4	-1.0	0.0	0.0	0.0
Ireland	91.0	63.9	-27.1	6.1	11.2	5.1	54.8	59.9	5.2	53.5	49.7	-3.8	4.4	24.0	19.6	0.0	0.0	0.0
Italy	59.3	44.1	-15.2	1.7	6.7	5.0	67.6	71.6	4.0	37.4	39.0	1.6	28.3	56.0	27.7	62.2	70.0	7.8
Japan	87.1	84.8	-2.3	0.9	2.2	1.3	60.3	61.1	0.8	34.7	24.0	-10.7	3.8	3.0	-0.8	0.0	0.0	0.0
Netherlands	80.6	42.3	-38.3	1.2	5.0	3.7	58.0	67.4	9.3	37.7	26.0	-11.7	14.0	52.5	38.5	0.0	40.0	40.0
Norway	83.3	72.3	-11.1	0.4	4.2	3.8	58.9	67.8	9.0	51.0	58.0	7.0	2.5	17.2	14.6	0.0	5.4	5.4
Portugal	81.7	60.7	-21.0	0.5	5.5	5.0	57.3	59.6	2.2	59.6	32.0	-27.6	0.0	61.6	61.6	0.0	0.0	0.0
Spain	84.6	54.9	-29.6	1.6	15.3	13.8	60.7	59.5	-1.3	9.9	19.0	9.1	37.5	49.0	11.5	30.0	30.0	0.0
Sweden	84.7	70.4	-14.3	1.7	7.2	5.6	60.2	66.9	6.7	68.8	91.0	22.2	15.0	14.4	-0.7	0.0	0.0	0.0
United Kingdom	88.4	62.4	-26.0	2.6	8.5	5.9	60.7	66.4	5.7	45.3	34.0	-11.3	22.3	16.9	-5.4	0.0	0.0	0.0
United States	82.1	66.0	-16.1	3.5	4.4	0.8	59.0	68.2	9.2	26.1	16.0	-10.1	5.6	6.4	0.9	0.0	0.0	0.0

	Dis repl			Old age repl.			Accr rate			Off. age.ret. (years)			Pens. wealth accr.			Soc. s. wealth accr.		
	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971	1971	1995	1995-1971
Australia	0.0	0.0	0.0	35.6	40.9	5.3	0.0	0.0	0.0	65	65	0	0.0	0.0	0.0	0.0	0.0	0.0
Canada	0.0	0.0	0.0	47.1	51.6	4.5	24.3	0.0	-24.3	65	65	0	0.4	-0.6	-1.0	0.4	-0.6	-1.0
Finland	45.5	60.0	14.5	44.2	60.0	15.8	22.6	6.2	-16.5	65	65	0	0.1	-2.3	-2.4	-0.8	-5.4	-4.6
France	0.0	0.0	0.0	53.1	50.0	-3.1	49.9	18.3	-31.6	65	60	-5	-0.2	-1.4	-1.2	-0.1	-4.9	-4.8
Western Germany	48.6	44.1	-4.5	60.2	55.0	-5.2	19.3	19.8	0.5	65	65	0	-0.9	-1.3	-0.4	-1.5	-4.0	-2.5
Ireland	0.0	0.0	0.0	42.4	39.7	-2.7	0.0	0.0	0.0	70	66	-4	-0.5	-1.3	-0.8	-0.5	-3.1	-2.6
Italy	55.5	0.0	-55.5	71.8	80.0	8.2	13.9	12.5	-1.4	60	61	1	-6.5	-8.6	-2.1	-6.5	-8.6	-2.1
Japan	0.0	0.0	0.0	30.5	52.1	21.6	11.2	5.9	-5.3	60	60	0	-2.1	-2.8	-0.7	-2.1	-2.8	-0.7
Netherlands	60.4	70.0	9.6	42.1	41.2	-0.9	22.2	22.2	0.0	65	65	0	-0.4	-0.5	-0.1	-0.7	-4.8	-4.1
Norway	57.2	57.0	-0.1	55.6	60.0	4.4	30.0	14.9	-15.2	67	67	0	-0.4	-1.3	-0.9	-0.4	-1.3	-0.9
Portugal	70.0	71.7	1.7	85.0	82.6	-2.4	17.6	12.1	-5.5	65	65	0	-0.4	-0.4	0.1	-0.4	-5.3	-4.9
Spain	55.0	75.0	20.0	100.0	100.0	0.0	0.0	0.0	0.0	65	65	0	-0.6	-1.2	-0.6	-1.4	-2.8	-1.4
Sweden	76.9	76.8	-0.1	74.3	74.5	0.1	24.3	0.0	-24.3	67	65	-2	-0.1	-1.8	-1.7	-1.7	-2.5	-0.8
United Kingdom	0.0	0.0	0.0	33.2	49.8	16.6	0.0	20.1	20.1	65	65	0	-0.7	-0.4	0.2	-2.4	-1.7	0.7
United States	0.0	0.0	0.0	40.2	56.0	15.8	0.0	0.0	0.0	65	65	0	-0.8	-1.1	-0.3	-0.8	-1.1	-0.3

Notes:

Part. rate	Participation rate older male workers.
UR	Unemployment rate of prime-aged male workers (25-54).
RPOP	Share of prime-aged male population in total male population.
UDENS	The proportion of workers who are member of trade-unions.
U repl	Replacement rate for unemployment rate (see main text).
Er repl	Replacement rate for special early retirement (see main text).
Dis repl	Replacement rate for occupational and/or labour market reasons (see main text).
Old age repl.	Replacement rate for old age pension at the standard retirement age.
Accr rate	Accrual rate : Percentage points increase in the synthetic pension replacement rate for a 55-year old male worker by working for ten more years.
Off. age.ret.	Official age of retirement for men.
Pens. wealth accr.	Changes in the pension wealth (measured as a multiple of annual earnings) for a 55 year-old person as a result of working for 10 more years.
Soc. s. wealth accr.	Changes in social security wealth (measured as a multiple of annual earnings) for a 55 year-old person as a result of working for 10 more years.

Table V.2 **Old-age male participation rate equations**
FGLS, population 55-64

	1971-1995												1961-1995				1971-95		
	Model 1				Model 2				Model 3				Model 4				Model 5 (interactions)		
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	
UR	**-1.640**	0.080 ***	**-1.408**	0.081 ***	**-0.872**	0.078 ***	**-0.618**	0.070 ***	**-0.802**	0.073 ***	**-0.565**	0.067 ***	**-0.756**	0.076 ***	**-0.595**	0.070 ***	**-0.620**	0.071	***
RPOP			**-0.467**	0.066 ***			**-0.923**	0.092 ***			**-0.886**	0.095 ***			**-0.761**	0.104 ***			
UDENS	**0.268**	0.031 ***	**0.292**	0.032 ***	**0.172**	0.046 ***	**0.126**	0.040 ***									**0.129**	0.046	***
U repl	**-0.214**	0.023 ***	**-0.192**	0.024 ***	**-0.207**	0.028 ***	**-0.151**	0.029 ***	**-0.206**	0.028 ***	**-0.151**	0.029 ***	**-0.252**	0.026 ***	**-0.213**	0.026 ***	**-0.144**	0.029	***
Er repl	**0.001**	0.022	**-0.004**	0.023	**-0.031**	0.026	**-0.045**	0.025 *	**-0.040**	0.028	**-0.049**	0.027 *	**-0.032**	0.029	**-0.041**	0.027	**-0.042**	0.024	*
Dis repl	**-0.027**	0.010 ***	**-0.015**	0.012	**0.007**	0.015	**0.004**	0.017	**0.020**	0.014	**0.009**	0.017	**0.009**	0.014	**-0.003**	0.016	**0.0062**	0.016	
Old age repl.	**0.022**	0.021	**-0.007**	0.026	**-0.013**	0.029	**-0.034**	0.037	**-0.023**	0.028	**-0.043**	0.035	**-0.055**	0.024 **	**-0.052**	0.029 *	**-0.042**	0.036	
Accr rate	**0.215**	0.038 ***	**0.131**	0.040 ***	**0.252**	0.038 ***	**0.134**	0.034 ***	**0.206**	0.035 ***	**0.089**	0.032 ***	**0.097**	0.027 ***	**0.068**	0.023 ***	**0.137**	0.034	***
Off. age.ret.	**0.018**	0.003 ***	**0.023**	0.003 ***	**0.008**	0.003 ***	**0.011**	0.003 ***	**0.009**	0.003 ***	**0.010**	0.003 ***	**0.010**	0.002 ***	**0.011**	0.002 ***	**0.010**	0.003	***
RPOP(low)																	**-0.798**	0.121	***
RPOP(medium)																	**-1.641**	0.314	***
RPOP(high)																	**-0.924**	0.143	***
Log Likelihood	920.6		932.6		1174.2		1206.5		1178.8		1207.2		1383.1		1406.1		1208.2		
N. of observations	366		366		365		365		365		366		431		431		365		
N. of countries	15		15		15		15		15		15		15		15		15		
N. of time periods	25		25		25		25		25		25		36		36		25		
χ^2 [1]	12359.4		9917.6		1580.1		1371.3		1816.0		1255.9		1354.6		1189.0		1489.8		
Test of country dummies (χ^2_{13})	1532.7		1441.0		176.9		78.2		179.6		113.0		156.8		80.9		62.8		
Wald tests (χ^2_1):																			
RPOP(low) = RPOP(intermediate)																	6.49 **		
RPOP(intermediate) = RPOP(high)																	4.24 **		

Notes:

Dependant variable = male active population (55-64) divided by total male population (55-64). For the description of the explanatory variables, see Table A3.1. Each specification includes country dummies which are not reported.

RPOP(low) = coefficient for RPOP for countries with decentralised wage bargaining.

RPOP(medium) = coefficient for RPOP for countries with intermediate wage bargaining.

RPOP(high) = coefficient for RPOP for countries with centralised/co-ordinated wage bargaining.

* Statistically signifiant at 10 % level; ** at 5 % level; *** 1% level.

1. Chi-squared of the signifiance of the regression equations.

Source: OECD.

Table V.3 **Participation rates of 55-64 year-old males: Summary of regression results 1971-1995**

Changes in explanatory variables	**Estimated change in participation rates[1]**	
	percentage points	significance
Old age pension system:		
Replacement rate (+10 percentage points)	0.5	
Accrual rate (+10 percentage points)	1.3-2.5	1% level
Standard retirement age (+ 1 year)	0.8-1.0	1% level
Early-retirement benefits:		
unemployment-related benefits (-10 percentage points)	1.5-2.0	1% level
special early retirement benefits (-10 percentage points)	0.3-0.5	
Structural labour market conditions		
Unemployment rate (-1 percentage point)	0.6-0.9	1% level
Share of prime age pop. (-1 percentage point)	0.9	1% level

1. These estimates are derived from the results of an econometric model based on a panel of cross-country time-series data and using Feasible Generalised Least Squares. The estimation procedure allows controlling for country-specific effects, group-wise heteroscedasticity and group-wise serial correlation of residuals. The coefficients used in this table are from Model 2 in Table V.2.
Source : OECD

Table V.4 **Accounting for the cross-country difference in participation rates, 1971-95**
Male workers aged 55-64

Panel A: **1971-95**

		Explaining the difference [1]					
	Part. rate $_i$	Part. rate $_i$ - Part. rate $_{OECD}$ [2]	UR	U repl	Er repl	Old age repl.	Accr rate	Standard ret. age
Australia	67.93	- 0.92	0.29	0.73	0.47	0.72	- 1.41	0.62
Canada	71.57	2.72	- 1.15	1.76	0.47	0.37	- 1.02	0.62
Finland	54.51	- 14.33	- 0.66	- 2.98	0.47	0.05	0.50	0.62
France	57.35	- 11.50	0.26	- 0.89	- 0.63	0.18	2.92	- 2.47
W Germany	64.37	- 4.47	0.67	- 1.84	0.14	- 0.02	1.12	0.62
Ireland	75.82	6.98	- 3.91	1.41	0.47	0.72	- 1.41	2.69
Italy	54.80	- 14.04	1.15	- 0.83	- 2.59	- 0.53	0.40	- 4.80
Japan	84.78	15.94	2.08	3.89	0.47	0.13	- 0.92	- 4.89
Netherlands	57.21	- 11.64	- 0.17	- 1.93	- 0.59	0.48	1.57	0.62
Norway	78.45	9.60	1.80	2.54	0.45	- 0.06	1.39	2.83
Portugal	71.02	2.18	1.34	- 1.76	0.47	- 0.74	- 0.66	0.62
Spain	70.79	1.95	- 2.41	- 2.55	- 0.88	- 1.40	- 1.41	0.62
Sweden	77.30	8.45	1.56	- 2.33	0.47	- 0.60	- 0.73	1.06
United Kingdom	75.75	6.91	- 0.87	1.48	0.34	0.49	1.07	0.62
United States	71.02	2.18	0.02	3.29	0.47	0.22	- 1.41	0.62
OECD-15 [2]	68.85							

Panel B: **1985-95**

		Explaining the difference [1]					
	Part. rate $_i$	Part. rate $_i$ - Part. rate $_{OECD}$ [2]	UR	U repl	Er repl	Old age repl.	Accr rate	Standard ret. age
Australia	60.93	- 1.08	0.18	0.66	0.55	0.71	- 1.18	0.87
Canada	64.39	2.38	- 1.01	2.05	0.55	0.31	- 1.18	0.87
Finland	46.51	- 15.50	- 1.36	- 3.59	0.55	0.02	0.02	0.87
France	45.74	- 16.27	- 0.23	0.84	- 0.71	0.31	1.22	- 4.64
W Germany	58.58	- 3.43	0.85	- 1.43	- 0.10	0.07	1.34	0.87
Ireland	67.70	5.69	- 4.67	1.38	0.55	0.68	- 1.18	1.97
Italy	50.70	- 11.31	1.19	- 1.32	- 2.60	- 0.66	0.49	- 4.44
Japan	83.73	21.72	3.04	4.35	0.55	0.12	- 0.51	- 4.64
Netherlands	44.50	- 17.52	0.38	- 3.14	- 1.16	0.55	1.79	0.87
Norway	74.27	12.26	1.96	2.21	0.50	- 0.01	0.98	3.07
Portugal	64.35	2.34	1.90	- 4.06	0.55	- 0.76	- 0.27	0.87
Spain	61.52	- 0.49	- 3.84	- 3.09	- 0.80	- 1.34	- 1.18	0.87
Sweden	73.68	11.67	1.85	- 0.85	0.55	- 0.54	- 1.18	0.87
United Kingdom	66.59	4.57	- 1.14	2.22	0.50	0.36	2.05	0.87
United States	66.98	4.97	0.92	3.77	0.55	0.18	- 1.18	0.87
OECD-15 [3]	62.01							

Notes:

Part. rate	Participation rate older male workers.
UR	Unemployment rate of prime-aged male workers (25-54).
U repl	Replacement rate for unemployment rate (see main text).
Er repl	Replacement rate for early retirement (see main text).
Old age repl.	Replacement rate for old age pension at the standard retirement age.
Accr rate	Accrual rate : Percentage points increase in the synthetic pension replacement rate for a 55-year old male worker by working for ten more years.
Standard ret. age	Official age of retirement for men.

1. Estimates based on model 2 in Table V.2.
2. Difference between the participation rate of country i and the OECD-15 average.
3. Simple average of the 15 countries.

Source: OECD.

Table V.5 **Old-age male participation rate and pension and social-security wealth accrual**
FGLS, population 55-64

	1971-1995											
	Model 6				Model 7				Model 8 (interactions)			
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
UR	**- 0.747**	0.078 ***	**- 0.605**	0.071 ***	**- 0.915**	0.078 ***	**- 0.765**	0.071 ***	**- 0.619**	0.071 ***	**- 0.769**	0.071 ***
RPOP			**- 0.805**	0.091 ***			**- 1.024**	0.091 ***				
UDENS	**0.107**	0.040 ***	**0.129**	0.039 ***	**0.094**	0.044 **	**0.139**	0.043 ***	**0.161**	0.044 ***	**0.174**	0.043 ***
U repl	**- 0.188**	0.030 ***	**- 0.149**	0.029 ***					**- 0.135**	0.031 ***		
Off. age.ret.	**0.018**	0.003 ***	**0.015**	0.003 ***	**0.011**	0.003 ***	**0.015**	0.002 ***	**0.016**	0.003 ***	**0.015**	0.002 ***
Pens. wealth accr.	**0.026**	0.004 ***	**0.018**	0.004 ***					**0.018**	0.004 ***		
Soc. s. wealth accr.					**0.017**	0.002 ***	**0.015**	0.002 ***			**0.015**	0.002 ***
RPOP(small)									**- 0.738**	0.094 ***	**- 0.840**	0.095 ***
RPOP(intermediate)									**- 0.987**	0.226 ***	**- 1.330**	0.212 ***
RPOP(large)									**- 0.989**	0.268 ***	**- 1.252**	0.266 ***
Log Likelihood	1187.5		1209.9		1184.0		1206.9		1208.1		1210.3	
N. of observations	365		365		365		366		365		366	
N. of countries	15		15		15		15		15		15	
N. of time periods	25		25		25		25		25		25	
χ^2 [1]	1501.6		1517.2		1616.2		1926.6		1571.5		2643.3	
Test of country dummies (χ^2_{13})	409.9		143.5		544.8		180.4		247.5		135.3	
Wald tests (χ^2_1) :												
RPOP(small) = RPOP(intermediate)									3.57 *		9.14 ***	
RPOP(intermediate) = RPOP(large)									0.01		0.40	

Notes:
Dependant variable = male active population (55-64) divided by total male population (55-64).
Pens. wealth accr. = Old-age pension wealth accrual (relative to annual earnings) for 55 year-old as a result of working for 10 more years.
Soc. s. wealth accr. = Old-age social security pension wealth accrual (relative to annual earnings) for 55 year-old as a result of working for 10 more years.
For the description of the other explanatory variables, see Table V.1. Each specification includes country dummies which are not reported.
RPOP(small) = coefficient for RPOP for countries with small variations in pension (or social-security) wealth.
RPOP(intermediate) = coefficient for RPOP for countries with intermediate variations in pension (or social-security) wealth.
RPOP(large) = coefficient for RPOP for countries with large variations in pension (or social-security) wealth.
* Statistically signifiant at 10 % level; ** at 5 % level; *** 1% level.
1. Chi-squared of the significance of the regression equations.

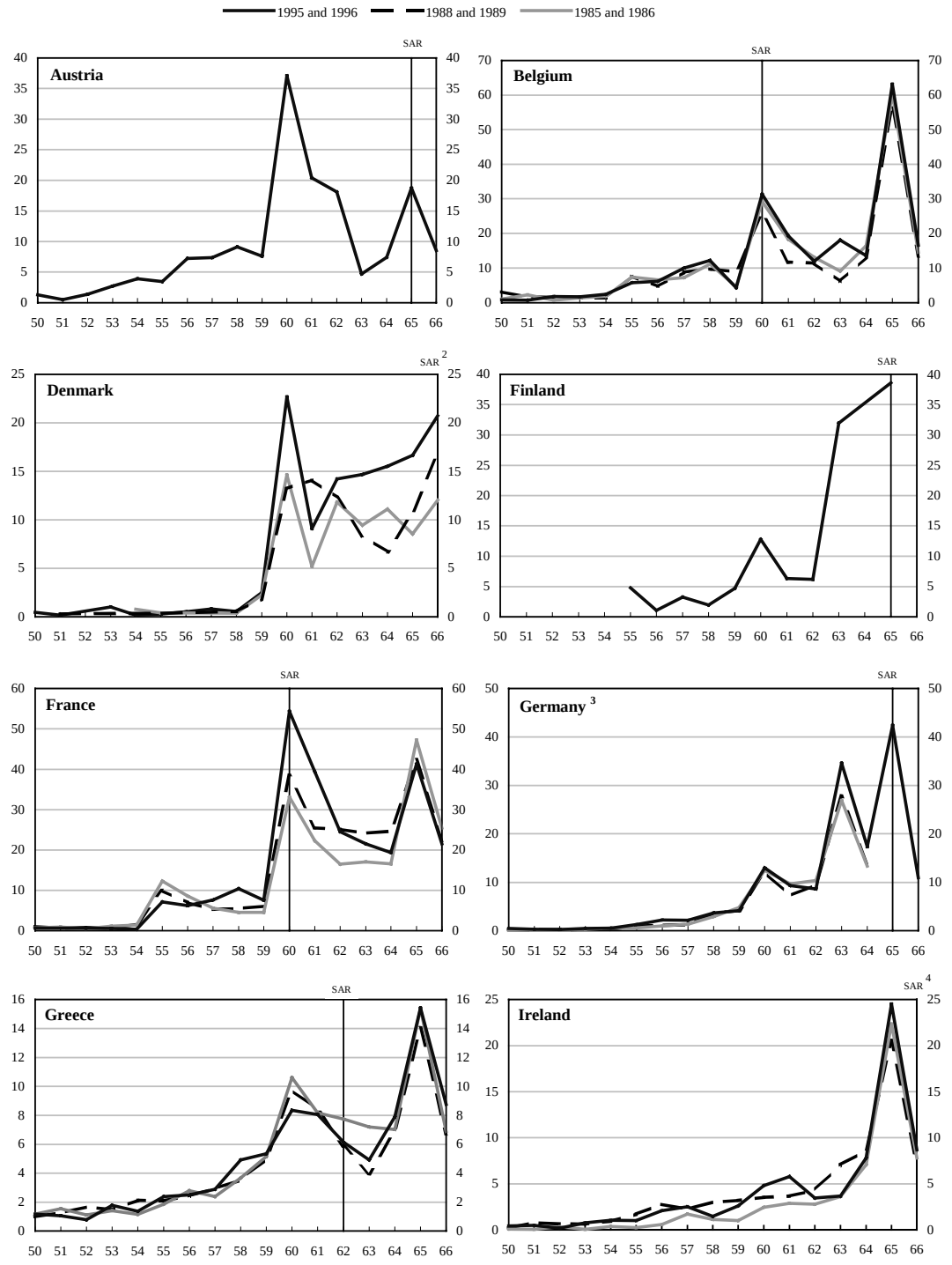
Source: OECD.

Table V.6 **Moving to an actuarially neutral pension system, 1995**
(in per cent of the population)

	expected change in older male participation rate [1]			*older male participation rates*		
				current	*expected*	
United States		2.9		66.0	68.9	68.9
Japan		3.9		84.8	88.8	88.8
Germany	3.4	-	6.8	57.8	61.2	64.6
France	3.6	-	8.3	41.5	45.1	49.9
Italy		20.1		44.1	64.2	64.2
United Kingdom	1.2	-	3.0	62.4	63.6	65.4
Canada		1.5		58.9	60.3	60.3
Australia		0.0		60.9	60.9	60.9
Finland	6.1	-	9.2	46.0	52.0	55.2
Ireland	3.5	-	5.3	63.9	67.4	69.2
Netherlands	1.3	-	8.2	42.3	43.5	50.4
Norway		3.3		72.3	75.6	75.6
Portugal	1.0	-	9.0	60.7	61.7	69.8
Spain	3.1	-	5.1	54.9	58.1	60.1
Sweden	4.2	-	4.6	70.4	74.5	75.0
Coefficient of variation				0.21	0.18	0.16

1. Estimates based on the empirical results presented in Table V.5.
Changes in older male participation rates are based on the assumption of a reform aimed at keeping constant the age profile of the pension wealth over the different retirement ages from 55 to 65. For the countries where two values are reported, the first refers to a reform of the pension system alone, and the second to a reform of both the pension system and the unemployment-related benefit system.
See Main text for more details.

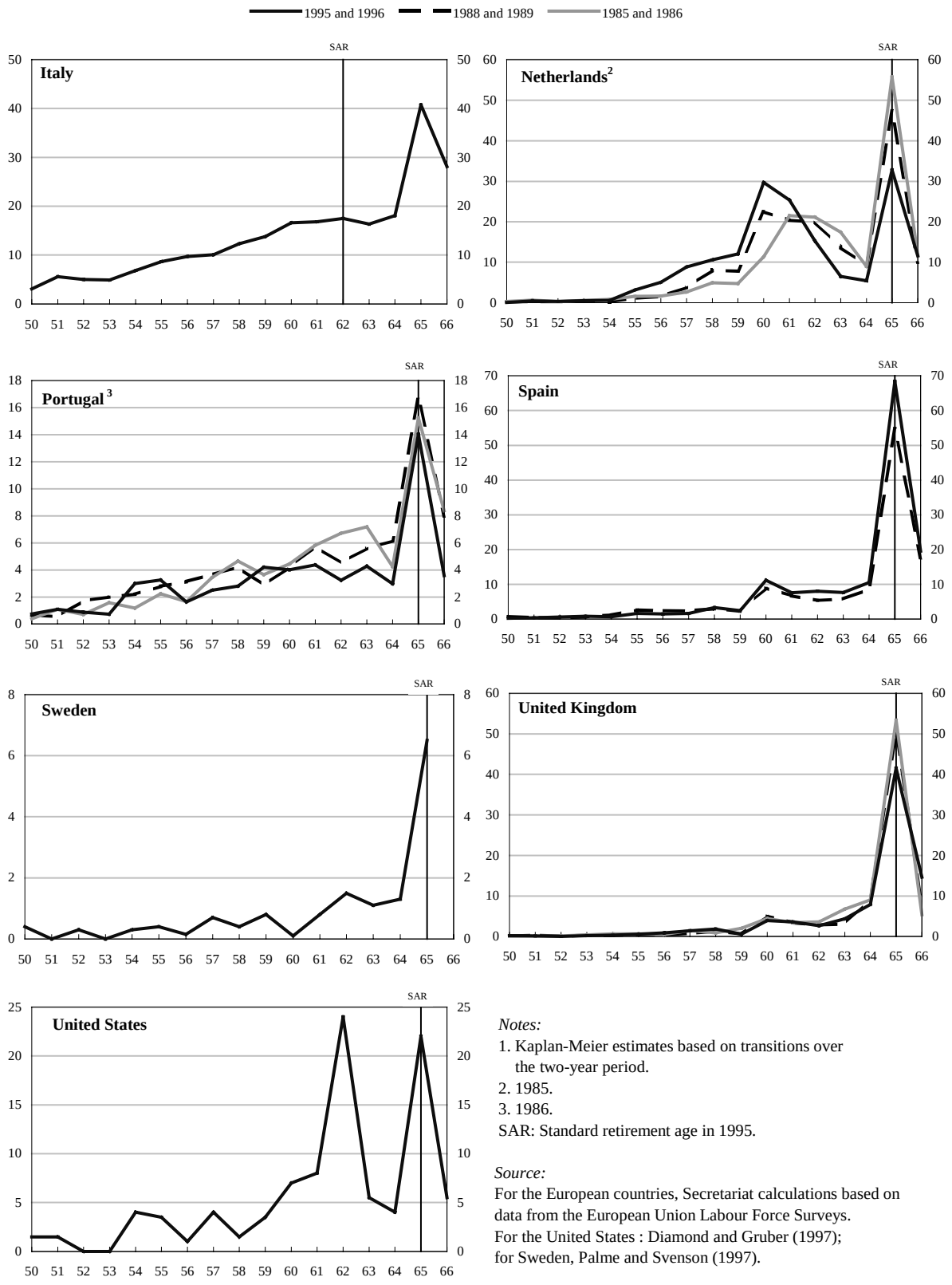
Figure II.1 **Conditional probability of moving from work to retirement[1]**
Males



Notes:
1. Kaplan-Meier estimates based on transitions over the two-year period.
2. 67 years.
3. 1995.
4. 66 years.
SAR: Standard retirement age in 1995.

Source:
Calculations based on data from the European Union Labour Force Surveys.

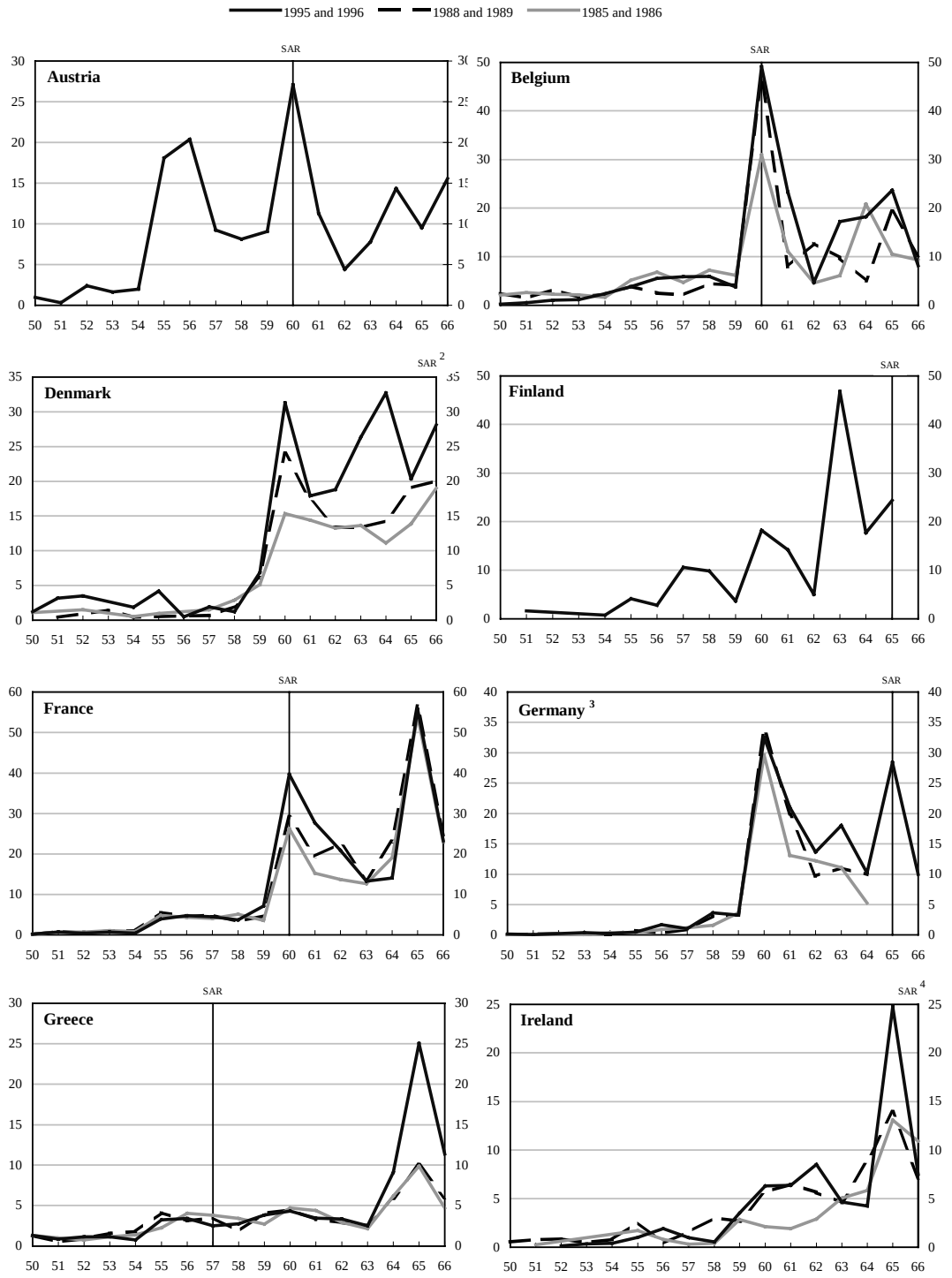
Figure II.1 (continued) **Conditional probability of moving from work to retirement [1]**
Males



Notes:
1. Kaplan-Meier estimates based on transitions over the two-year period.
2. 1985.
3. 1986.
SAR: Standard retirement age in 1995.

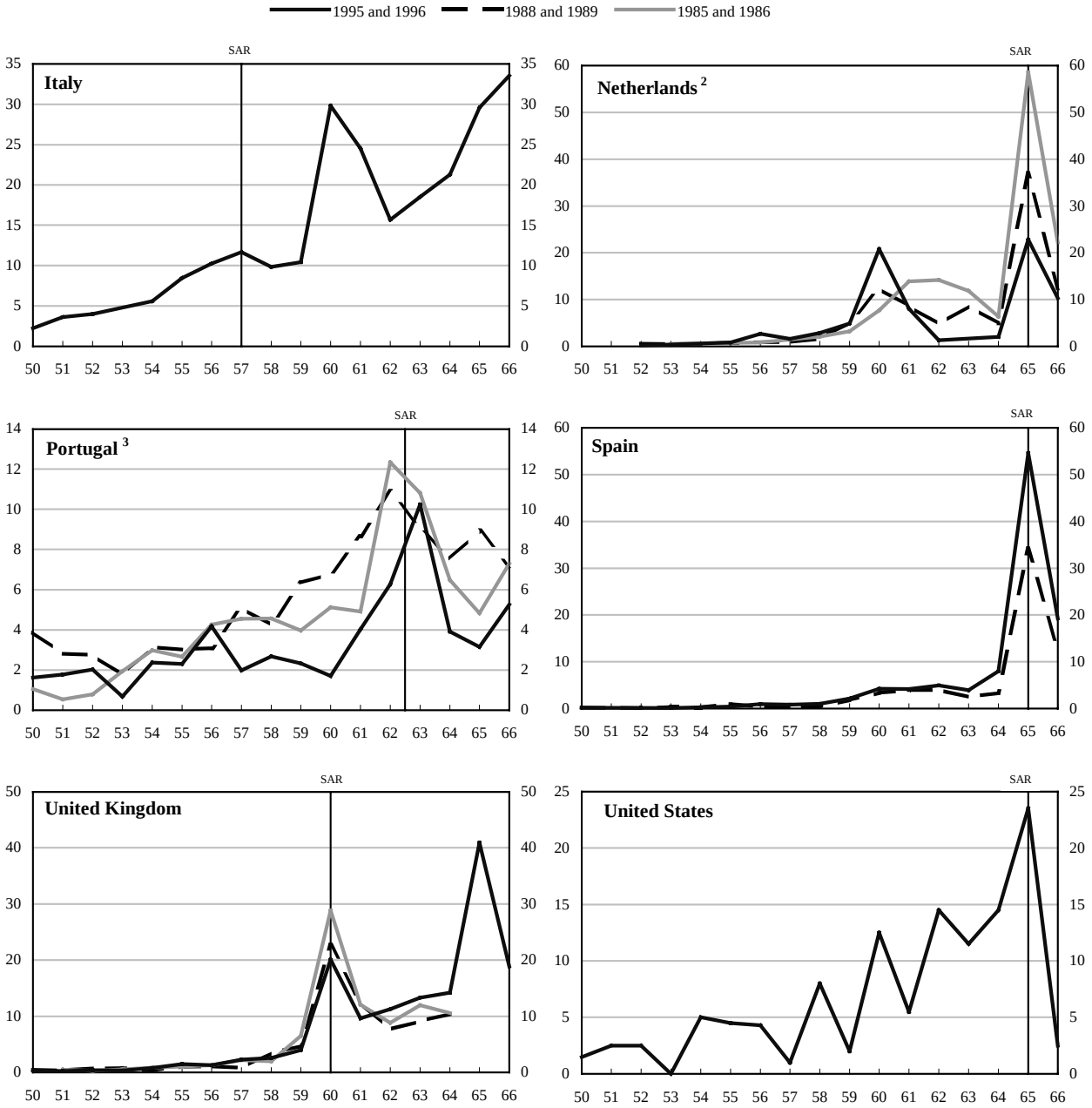
Source:
For the European countries, Secretariat calculations based on data from the European Union Labour Force Surveys.
For the United States : Diamond and Gruber (1997);
for Sweden, Palme and Svenson (1997).

Figure II.1 (continued) **Conditional probability of moving from work to retirement [1]**
Females



Notes:
1. Kaplan-Meier estimates based on transitions over the two-year period.
2. 67 years.
3. 1995.
4. 66 years.
SAR: Standard retirement age in 1995.
Source:
Secretariat calculations based on data from the European Union Labour Force Surveys.

Figure II.1 (continued) **Conditional probability of moving from work to retirement [1]**
Females

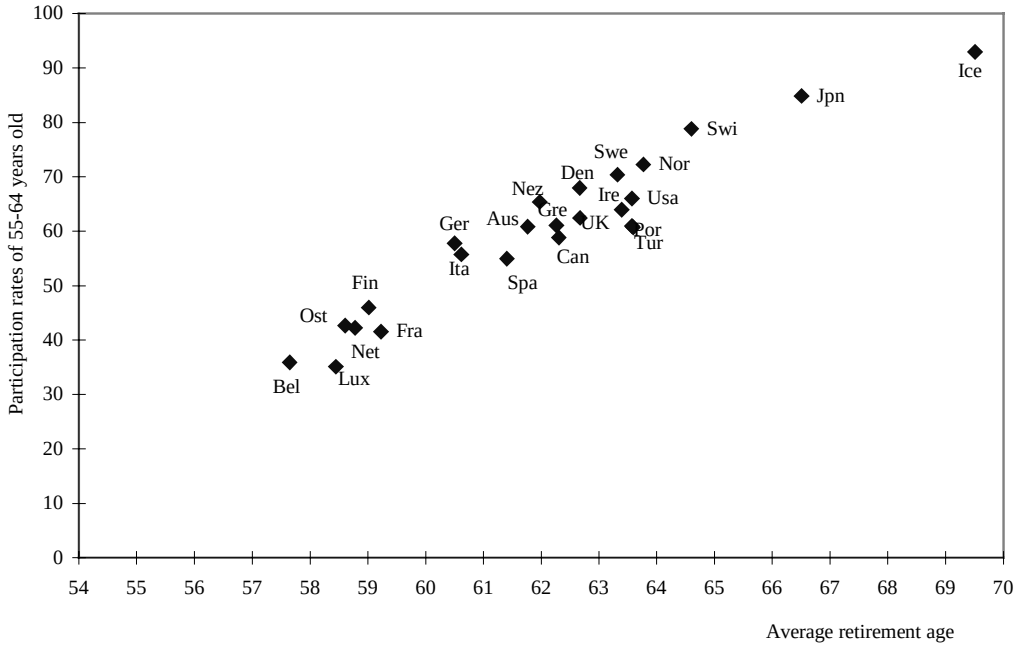


Notes:
1. Kaplan-Meier estimates based on transitions over the two-year period.
2. 1985.
3. 1986.
SAR: Standard retirement age in 1995.

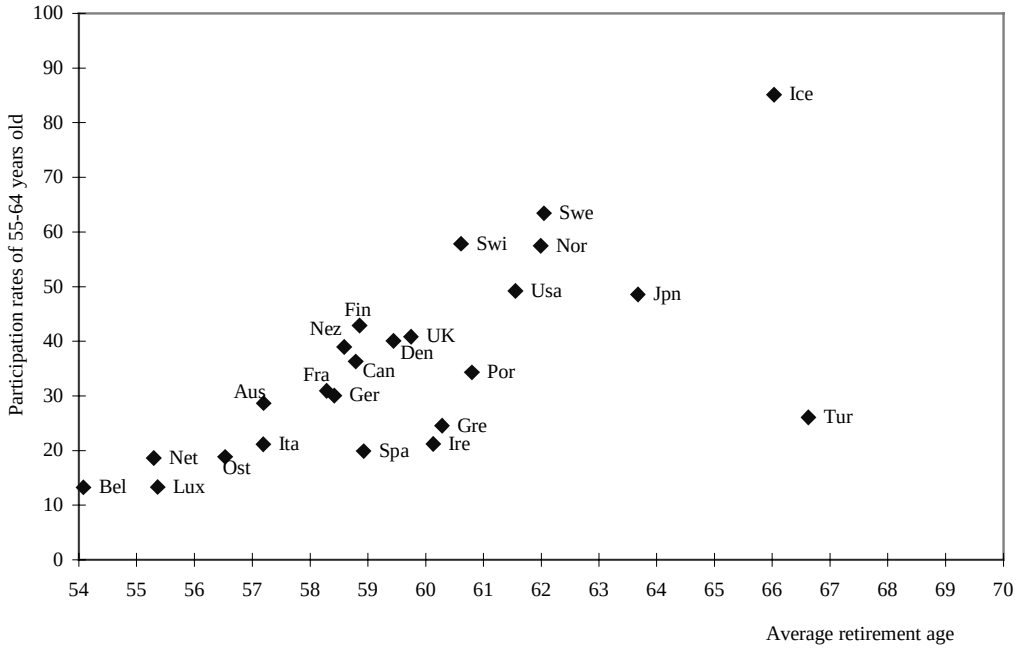
Source:
For the European countries, Secretariat calculations based on data from the European Union Labour Force Surveys.
For the United States : Diamond and Gruber (1997).

Figure II.2 **Average retirement ages and participation rates of older workers**
1995

Males



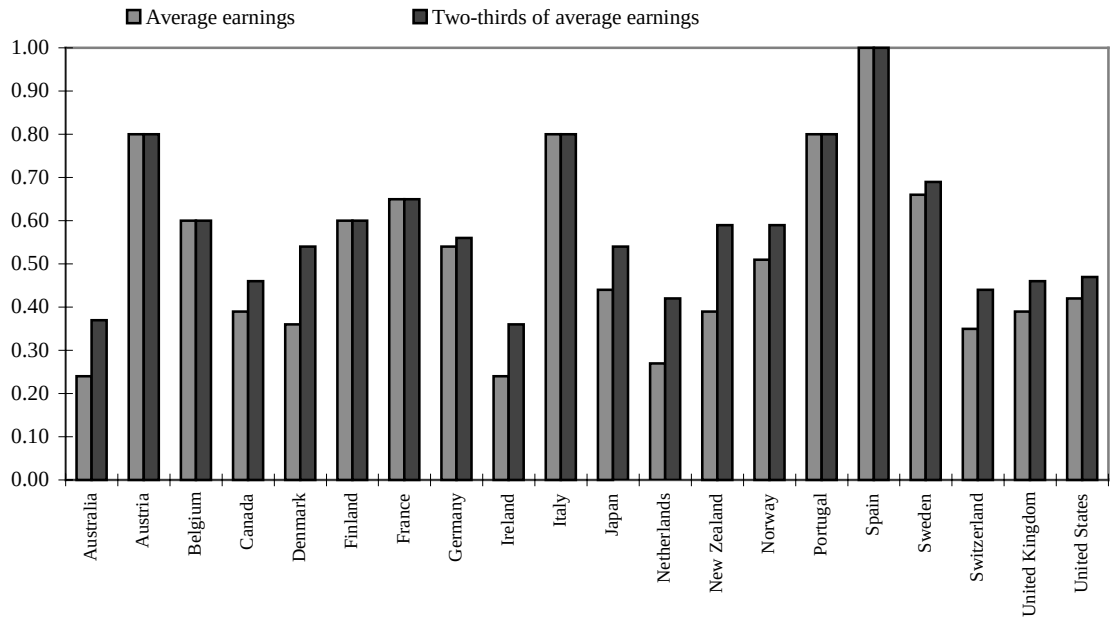
Females



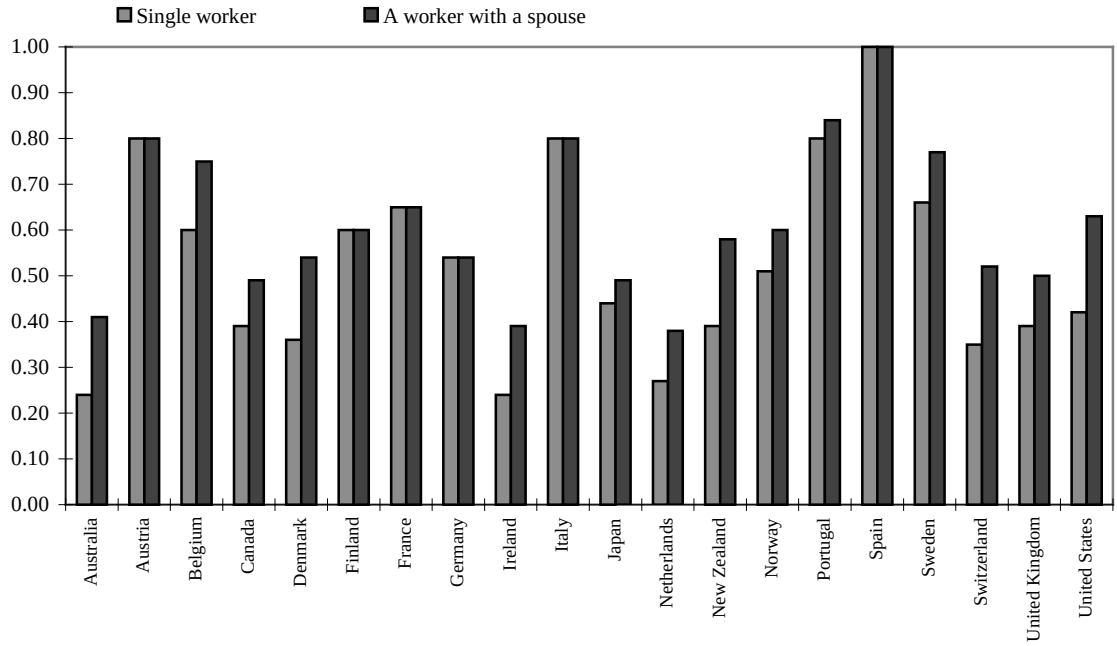
Source:
For average retirement age, see Table II.1. For participation rates: *OECD Labour Force Statistics* .

Figure III.1 **Replacement rates by earning levels and family structure, 1995**

A. **Replacement rate by earning levels for a single worker**

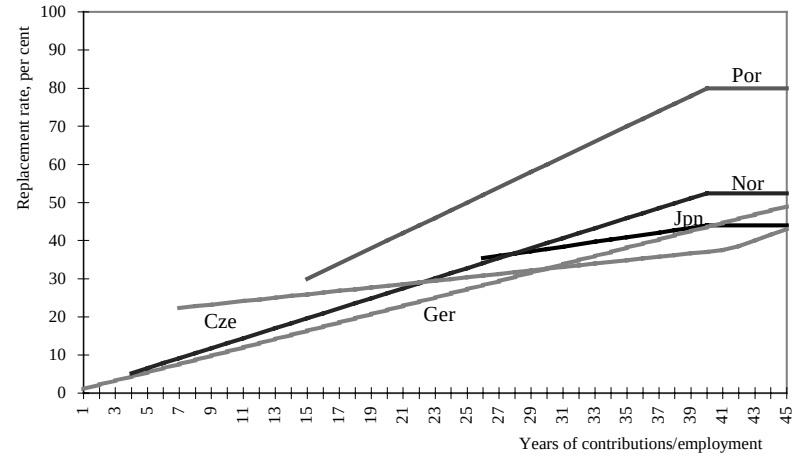


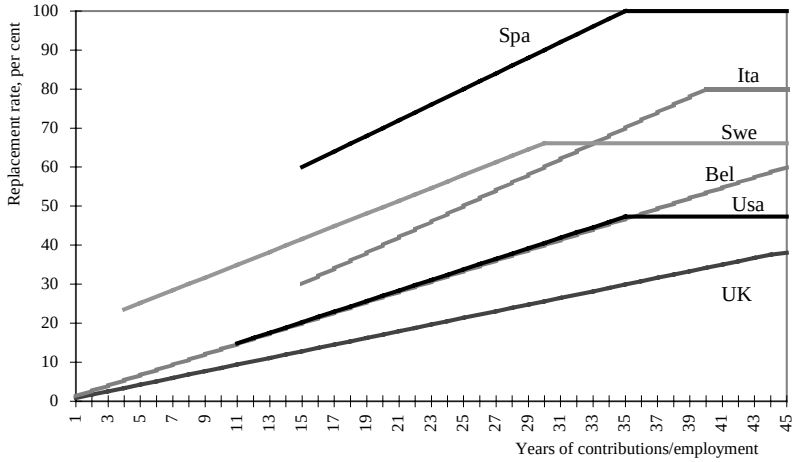
B. **Replacement rate by family structure, average earnings**

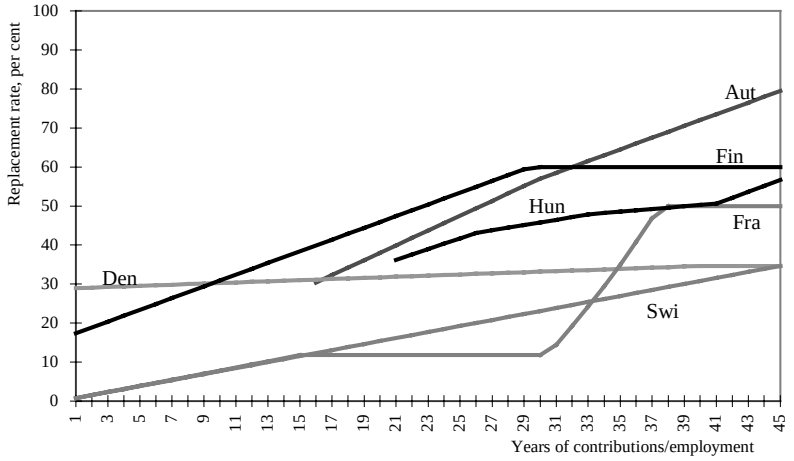


Source: OECD

Figure III.2 **Pension accrual profiles, 1995**
(single workers)

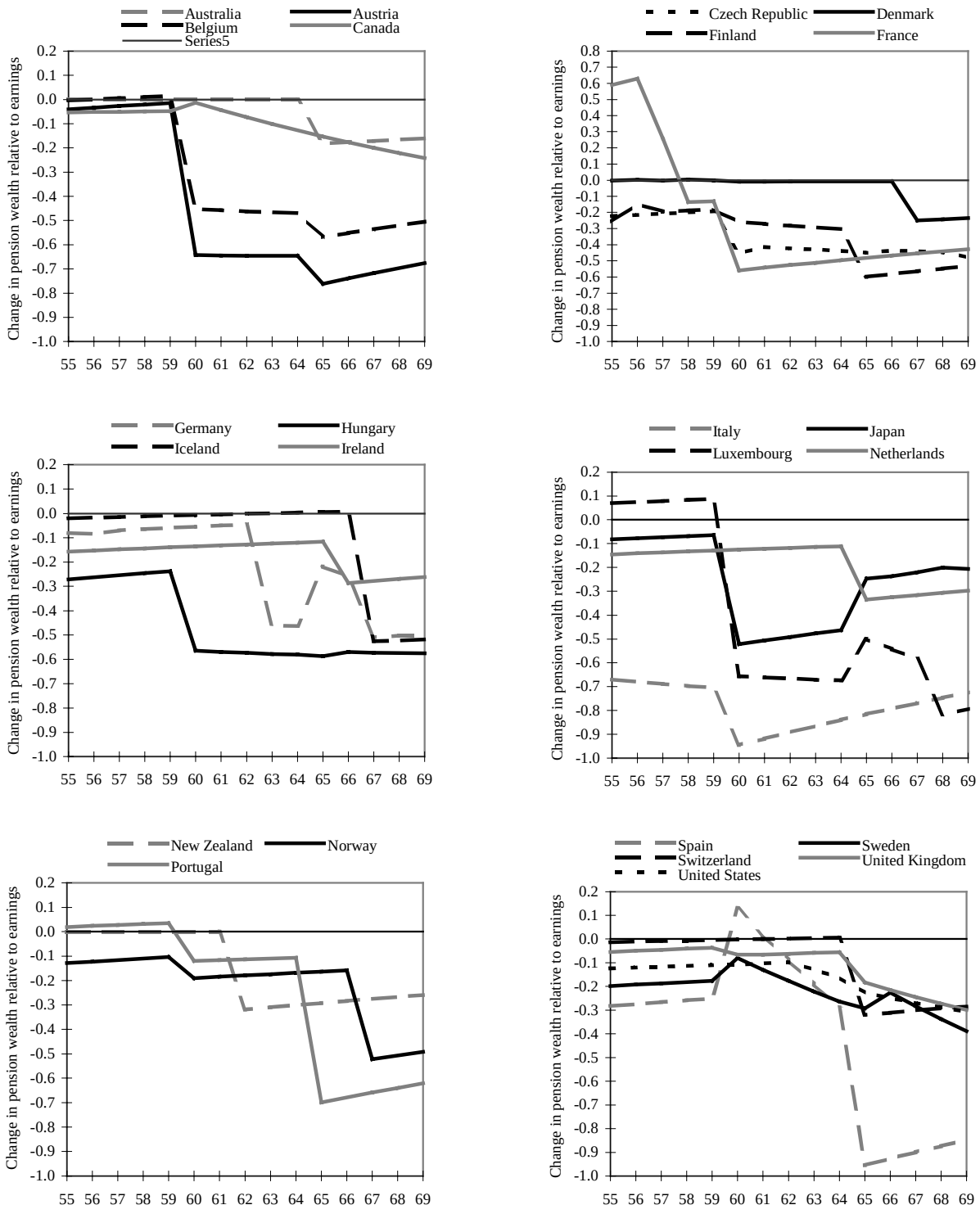






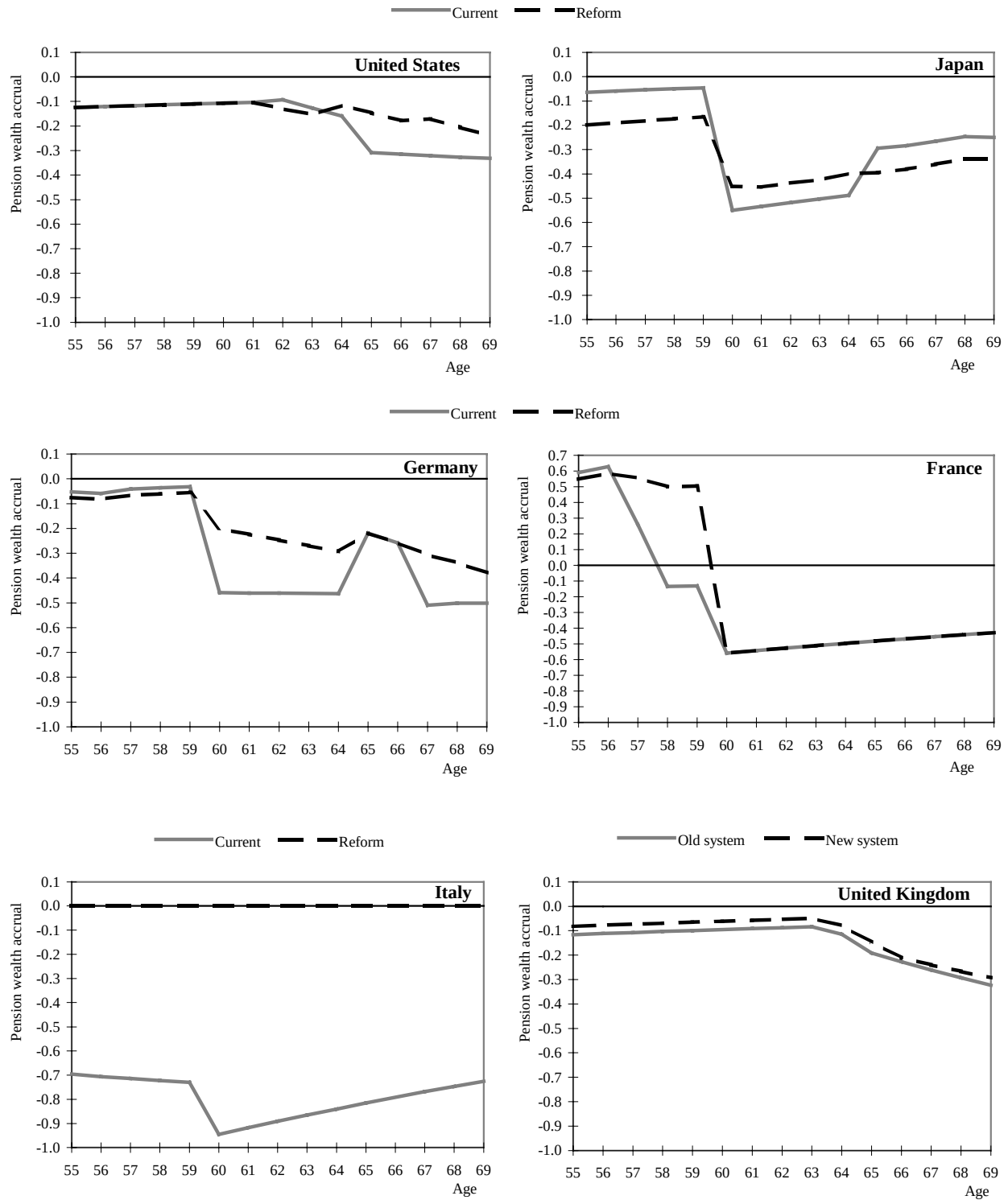
Source:
U.S. Department of Health and Human Services, *Social Security Programs Throughout the World,* 1995 issue, national sources.

Figure III.3 **Pension wealth accruals at different ages of retirement, 1995**
Single workers, average earnings
(relative to annual earnings)



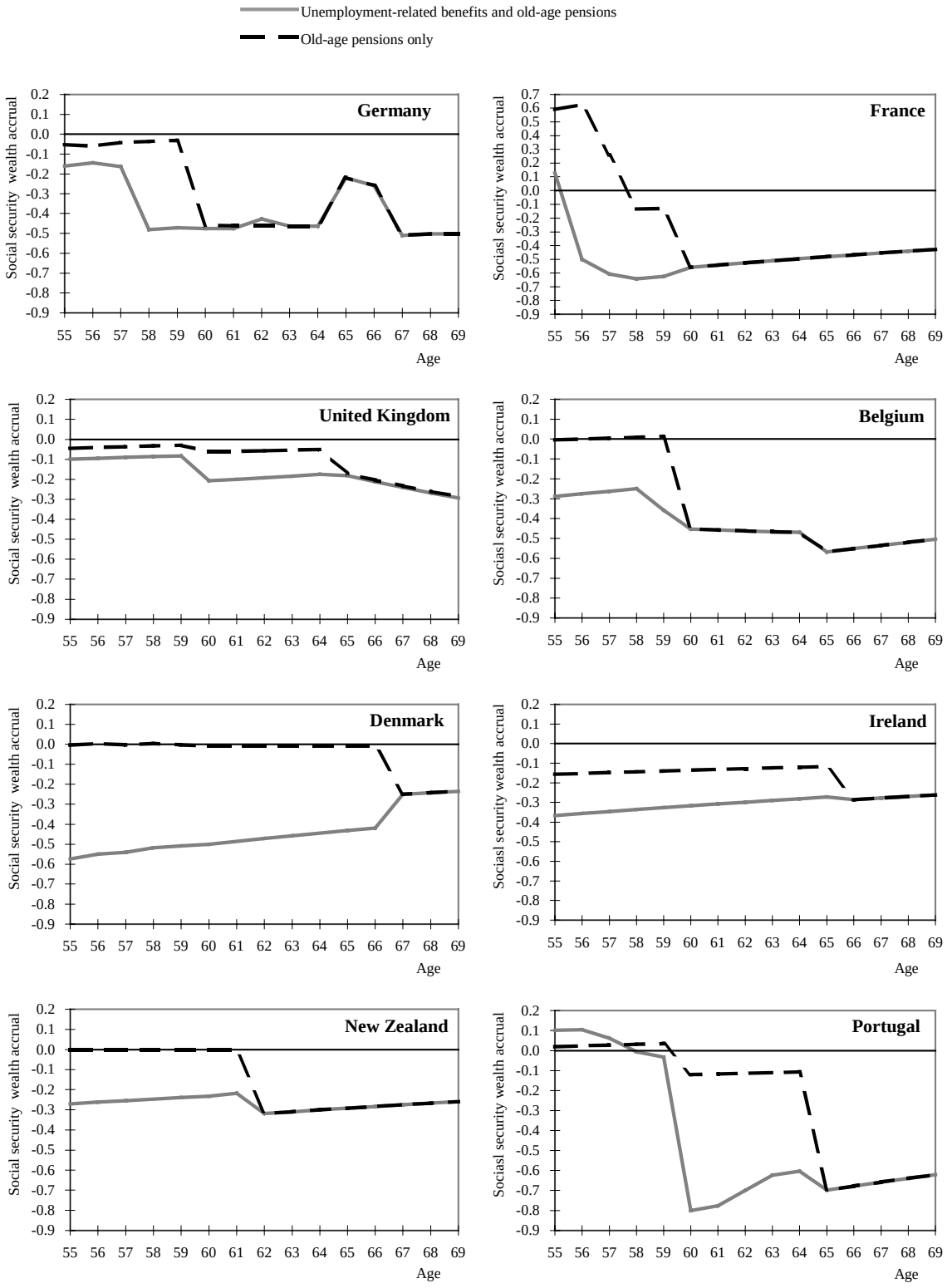
Source: OECD, based on data reported in Table A.8.

Figure III.4 **Reforms to old-age pension systems: Impact on pension wealth accrual profiles**
Single workers, average earnings
(relative to annual earnings)



Source: OECD.

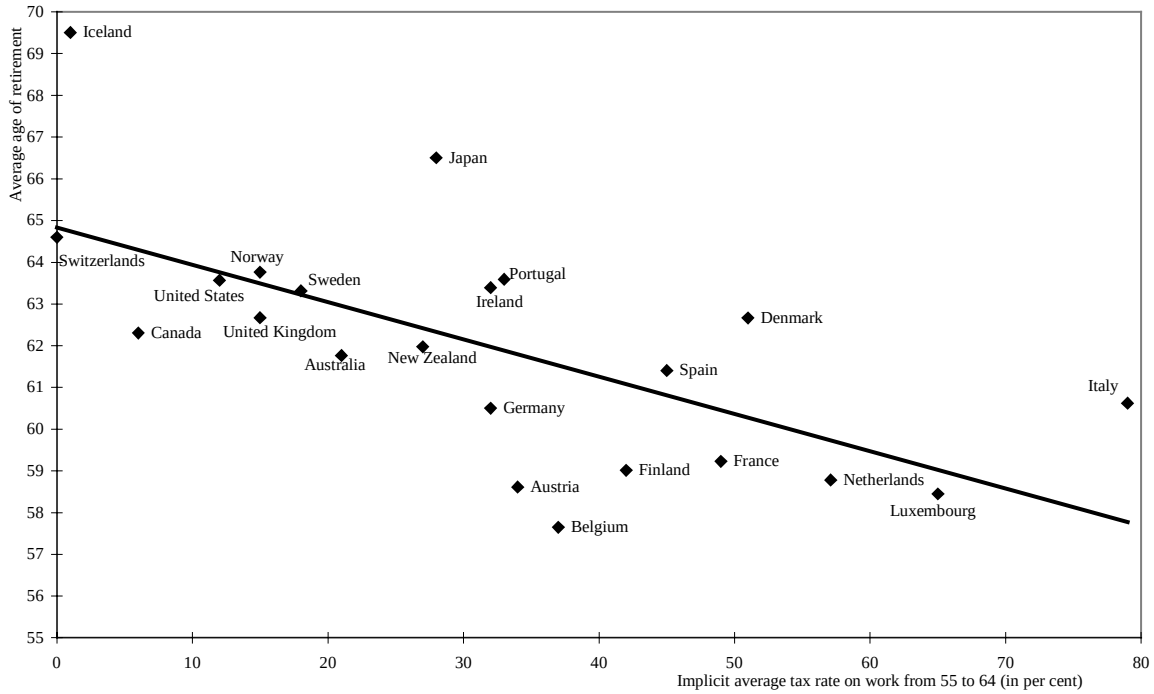
Figure IV.1 **Unemployment-related benefits: Impact on social-security wealth accruals, 1995**
Single workers, average earnings
(relative to annual earnings)



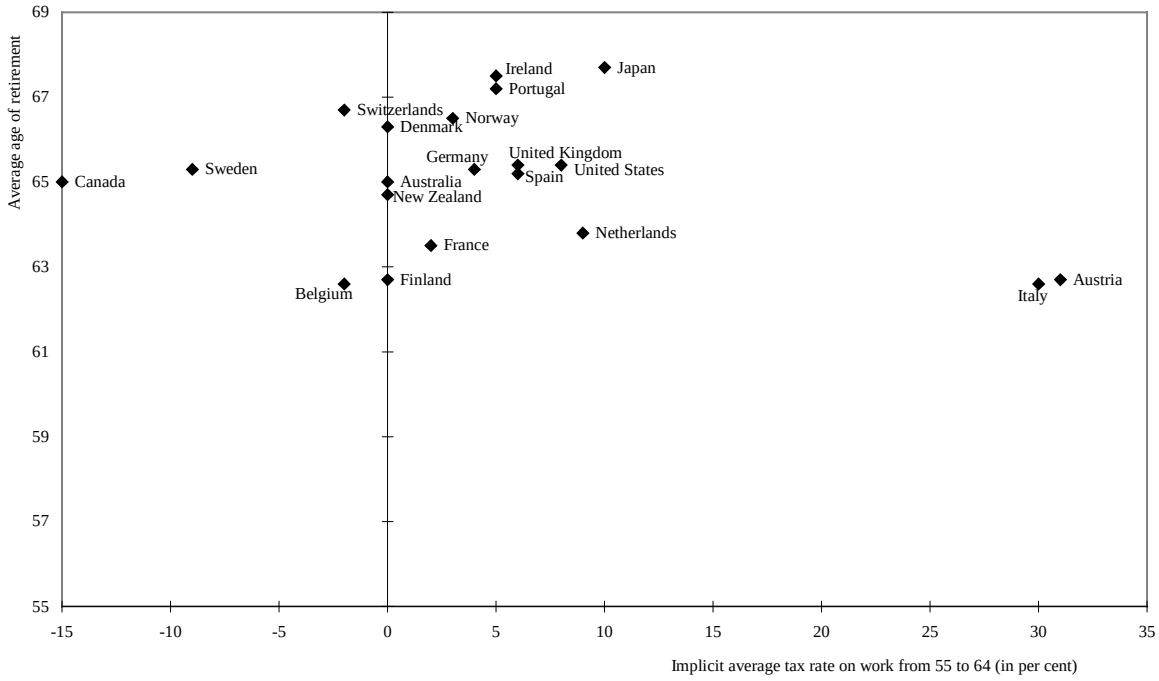
Source: OECD.

FigureV.1 **Implicit tax rates on continued work and average age of retirement, males, 1967-1995**

Panel A: 1995



Panel B: 1967.



Note: The implicit tax rates take into account incentives in both old-age pension and unemployment-related benefit systems.

Source: OECD.

ANNEX: SUPPORTING MATERIAL

Table A.1 **Part-time work and estimates of the average retirement age, 1995**
(estimates of the average retirement age excluding older workers working less than 10 hours a week)

	Males				Females			
Country	Original	adjusted	difference	%	Original	adjusted	difference	%
Austria	58.6	58.5	-0.09	-0.15	56.5	56.3	-0.23	-0.41
Belgium	57.6	57.6	-0.03	-0.04	54.1	54.0	-0.05	-0.09
Denmark	62.7	62.2	-0.44	-0.71	59.4	59.0	-0.45	-0.76
Finland	59.0	58.9	-0.11	-0.18	58.9	58.7	-0.13	-0.22
France	59.2	59.2	-0.04	-0.07	58.3	58.1	-0.22	-0.37
Germany	60.5	60.4	-0.09	-0.15	58.4	58.2	-0.25	-0.43
Greece	62.3	62.2	-0.02	-0.04	60.3	60.3	-0.03	-0.05
Ireland	63.4	63.3	-0.05	-0.07	60.1	59.9	-0.25	-0.41
Italy	60.6	60.6	-0.06	-0.11	57.2	57.1	-0.04	-0.08
Luxembourg	58.4	58.4	0.00	0.00	55.4	55.3	-0.05	-0.09
Netherlands	58.8	58.4	-0.36	-0.61	55.3	54.8	-0.49	-0.89
Portugal	63.6	63.5	-0.05	-0.08	60.8	60.6	-0.19	-0.32
Spain	61.4	61.4	-0.01	-0.01	58.9	58.8	-0.15	-0.26
Sweden	63.3	62.9	-0.40	-0.62	62.1	61.6	-0.43	-0.69
United Kingdom	62.7	62.3	-0.36	-0.57	59.7	58.9	-0.81	-1.35

Note:
The adjusted series is based on group-specific labour forces which exclude individuals (55 and over years age) working less 10 hours per week.

Source: Calculations based on *Economically active population 1950 - 2010* , ILO (December 1996)

Table A.2 **Proportion of part-time employment by age and sex, 1995, by country**

	Men			Women		
	55-59	60-64	All	55-59	60-64	All
Austria	3.9	33.8	4.0	33.6	48.2	26.9
Belgium	2.8	5.9	2.8	31.4	18.7	29.8
Denmark	4.6	17.5	10.4	39.3	57.9	35.4
Finland	9.8	21.1	7.9	14.1	24.7	15.7
France	7.9	18.3	5.1	34.8	38.3	28.9
Germany	3.2	7.9	3.6	44.8	55.4	33.8
Greece	2.6	3.9	2.8	11.7	14.0	8.4
Ireland	4.4	4.9	5.4	33.3	32.9	23.1
Italy	3.0	5.4	2.9	12.3	11.5	12.7
Luxembourg	0.7	2.7	1.1	27.3	17.6	20.3
Netherlands	18.4	34.8	16.7	81.8	83.8	67.3
Portugal	5.5	9.5	4.2	18.4	23.1	11.6
Spain	2.2	2.5	2.7	17.2	18.2	16.6
Sweden	10.3	34.1	10.1	45.5	60.5	41.0
Switzerland[1]	5.6	13.5	8.1	65.9	66.9	52.9
United Kingdom	8.0	16.2	7.7	55.3	70.6	44.3

1. 1996.

Source: The European Union Labour Force Survey, 1995; Swiss Labour Force Survey, 1996.

Table A.3 **Proportion of part-time workers working less than 10 hours per week, 1995** (percentage)

	Age	Men	Women
Austria	55-59	17.8	19.3
	60-64	16.0	21.4
	65 and more	19.4	30.6
Belgium	55-59	3.3	5.9
	60-64	14.8	6.9
	65 and more	17.2	28.6
Denmark	55-59	12.8	7.6
	60-64	21.9	19.7
	65 and more	53.9	40.9
Finland	55-59	19.0	3.8
	60-64	3.9	19.4
	65 and more	14.0	33.9
France	55-59	6.5	11.1
	60-64	8.4	20.7
	65 and more	7.1	17.9
Germany	55-59	12.6	10.1
	60-64	22.8	20.5
	65 and more	24.8	27.3
Greece	55-59	9.2	4.4
	60-64	9.9	4.7
	65 and more	4.7	2.1
Ireland	55-59	5.9	10.9
	60-64	7.1	11.2
	65 and more	12.5	19.5
Italy	55-59	21.4	12.5
	60-64	19.4	9.1
	65 and more	16.9	6.6
Luxembourg	55-59	0.0	12.0
	60-64	0.0	0.0
	65 and more	0.0	0.0
Netherlands	55-59	12.0	21.8
	60-64	31.1	35.5
	65 and more	48.6	37.7
Portugal	55-59	2.6	16.6
	60-64	7.4	20.2
	65 and more	5.4	6.8
Spain	55-59	1.1	18.0
	60-64	0.0	15.1
	65 and more	4.8	9.7
Sweden	55-59	0.0	2.7
	60-64	9.0	5.7
	65 and more	38.2	48.8
Switzerland	55-59	14.5	24.0
	60-64	23.9	32.1
	65 and more	46.7	61.0
United Kingdom	55-59	16.6	15.5
	60-64	22.7	23.1
	65 and more	26.6	40.1

Source : as in Table A.2.

Table A.4 **Distribution of older workers and of all workers by industry, 1995**

Men

	Austria		Belgium		Denmark		Finland		France		Germany		Greece		Ireland		Italy		Luxembourg		Netherlands		Portugal		Spain		Sweden		Switzerland		United Kingdom	
	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All
Agriculture, hunting , forestry and fishing	11.3	9.4	4.3	5.6	7.7	6.9	10.6	9.7	6.7	8.8	7.8	8.1	5.6	7.5	8.6	9.9	9.2	9.6	4.4	4.9	4.9	6.8	5.4	6.6	8.1	8.8	9.6	8.4	6.2	5.0	5.5	6.1
Mining and quarrying	0.3	1.0	1.0	0.9	0.1	0.4	0.2	1.0	0.8	1.3	1.8	2.1	0.8	1.8	0.3	1.1	0.6	1.3	0.0	0.3	0.0	0.8	0.4	0.8	0.7	1.5	0.0	0.7	0.1	0.2	1.4	2.1
Manufacturing	15.2	13.5	13.3	15.1	11.0	12.9	15.4	16.7	12.1	10.7	12.8	11.3	11.9	12.0	9.3	10.3	13.1	12.3	13.6	12.8	10.8	10.3	11.6	13.8	13.2	10.9	12.0	11.6	27.6	24.6	10.0	10.4
Electricity, gas and water supply	1.8	3.2	2.1	2.4	3.4	2.4	1.1	2.7	1.7	2.7	3.5	3.4	2.5	3.2	2.6	3.1	1.7	2.4	1.2	1.8	2.4	2.1	4.3	3.2	2.1	2.8	2.6	2.3	2.0	1.2	1.8	2.5
Construction	7.7	8.1	6.1	10.1	8.7	8.4	6.2	8.0	9.0	8.7	9.6	9.3	6.2	7.9	5.5	8.2	10.0	10.6	4.2	8.8	6.5	6.4	7.7	7.7	6.7	8.8	9.9	10.0	9.5	11.2	8.7	9.7
Wholesale, retail trade &hotels and restaurants	14.1	16.3	18.8	19.3	14.3	14.6	12.8	13.6	15.1	16.9	15.6	16.5	19.2	22.1	12.0	13.6	20.7	21.3	17.8	18.2	14.6	17.6	17.2	17.0	19.1	19.6	15.5	18.5	14.7	16.2	16.4	16.9
Transport, storage and communication	6.0	7.0	6.4	6.9	6.1	8.1	4.6	7.5	4.6	6.3	7.1	7.0	7.9	8.4	3.4	4.1	7.0	6.0	5.7	7.7	5.7	6.5	6.3	6.1	6.6	7.1	8.0	8.8	7.3	7.4	7.5	8.0
Financial intermediation & Real estate, renting and business activities	12.7	13.8	14.8	14.9	14.4	16.4	14.7	15.8	17.7	15.3	16.4	16.8	13.3	13.4	19.0	18.4	12.5	12.2	13.8	15.5	20.4	18.6	12.6	17.1	12.8	15.5	16.8	15.4	12.1	16.0	17.1	16.2
Public administration and defence;compulsory social security	8.4	7.5	9.3	8.5	11.0	8.4	7.5	6.7	7.5	6.4	5.3	5.1	7.5	5.4	6.0	5.0	6.9	6.0	12.7	10.3	7.3	7.0	9.8	8.9	7.9	5.8	7.5	5.6	5.8	4.8	5.6	5.8
Education	8.7	6.4	9.6	6.0	10.1	8.0	14.6	7.6	7.9	6.5	4.9	4.7	9.4	5.8	10.3	7.5	5.6	4.0	9.4	5.8	8.1	6.5	11.9	7.5	7.7	6.0	5.4	5.2	4.9	5.3	7.9	5.9
Other services	13.7	13.9	14.4	12.3	13.2	13.6	12.3	10.7	16.9	14.3	15.2	15.6	15.6	12.6	24.9	19.0	12.8	14.3	17.2	14.0	19.4	17.3	13.9	11.3	15.1	13.5	12.6	13.5	9.7	7.9	18.1	16.3
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Women

	Austria		Belgium		Denmark		Finland		France		Germany		Greece		Ireland		Italy		Luxembourg		Netherlands		Portugal		Spain		Sweden		Switzerland		United Kingdom	
	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All	55-64	All
Agriculture, hunting , forestry and fishing	17.5	8.3	9.5	2.9	3.9	3.4	10.3	6.4	7.3	6.3	6.5	6.5	9.1	4.7	8.2	6.3	10.1	8.8	6.2	2.8	5.7	4.8	6.5	4.0	3.5	4.4	4.7	4.6	6.5	3.8	4.9	3.8
Mining and quarrying	0.0	0.6	0.0	0.1	0.0	0.6	0.0	0.1	0.1	0.3	0.9	1.2	0.0	0.1	0.0	0.4	0.0	0.3	0.0	0.0	0.0	0.5	0.0	0.1	0.7	0.4	0.2	0.2	0.0	0.0	0.2	0.5
Manufacturing	7.8	9.0	5.3	9.8	6.8	11.8	9.1	11.3	8.5	9.3	10.9	10.0	9.3	10.0	3.8	8.6	10.0	10.8	6.2	5.2	6.2	8.0	7.7	10.9	5.6	8.1	12.1	11.3	14.7	12.4	8.9	8.8
Electricity, gas and water supply	0.9	0.9	1.2	1.2	0.6	0.4	0.0	0.5	0.8	1.6	0.8	1.8	0.3	1.4	0.0	1.6	0.4	0.9	0.0	0.1	0.1	1.0	0.3	0.7	1.2	1.4	0.9	1.2	0.0	0.2	0.2	1.4
Construction	4.5	5.1	2.2	2.2	3.4	2.5	0.0	1.3	2.6	3.6	4.3	5.4	0.3	1.1	0.8	2.8	0.7	2.9	0.4	2.4	2.2	3.2	0.2	1.8	0.5	3.2	1.1	2.4	3.0	2.5	3.5	3.7
Wholesale, retail trade &hotels and restaurants	25.3	21.2	23.3	20.9	11.1	16.2	12.0	16.4	16.7	18.8	18.7	18.2	25.5	22.8	15.2	17.8	24.1	23.8	16.7	17.6	17.1	19.5	20.0	17.5	23.2	23.8	15.2	20.0	24.1	24.5	21.1	19.7
Transport, storage and communication	3.3	3.3	5.1	5.1	5.2	5.4	4.1	4.9	3.9	4.9	4.8	5.2	2.7	4.8	0.8	3.2	2.2	2.9	3.3	3.7	2.7	5.5	4.5	5.4	4.0	4.9	2.7	5.6	3.1	4.5	3.6	5.2
Financial intermediation & Real estate, renting and business activities	8.6	13.1	13.1	15.8	12.6	15.0	5.5	11.4	13.8	15.5	13.9	15.7	8.6	15.3	13.1	16.2	7.5	12.1	6.2	20.0	12.7	15.9	2.9	15.5	8.6	15.0	14.3	15.9	10.6	14.2	14.6	16.0
Public administration and defence;compulsory social security	4.8	6.1	12.8	8.8	4.9	7.0	6.5	5.7	8.6	7.0	7.1	5.9	6.0	5.4	6.5	5.3	7.8	5.4	10.9	9.5	9.5	8.1	12.9	10.5	10.6	6.3	10.0	7.0	4.5	3.4	6.3	6.5
Education	10.5	9.1	8.4	9.7	15.0	11.2	24.9	13.8	11.4	8.7	8.0	7.2	16.1	11.7	21.0	13.6	16.6	8.5	19.9	10.1	14.4	8.9	15.7	11.5	16.6	9.6	12.9	8.8	7.6	8.6	11.1	9.2
Other services	17.0	21.4	19.1	23.5	36.8	26.5	27.6	28.2	26.3	24.2	24.5	23.2	22.2	22.6	30.5	24.0	20.4	23.6	30.4	28.6	29.4	24.6	29.3	22.1	25.5	22.8	25.9	23.1	25.7	26.0	23.8	23.1
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

1. 1996.

Source : as in Table A.2.

Table A.5 **Proportion of older worker who are self-employed, 1995**

	Men			Women		
	55-59	60-64	All ages	55-59	60-64	All ages
Austria	23.1	30.3	12.4	23.7	26.1	8.8
Belgium	30.0	50.1	18.4	20.7	44.5	11.0
Denmark	20.8	30.6	11.9	7.8	5.9	4.0
Finland	28.2	50.3	18.7	13.0	34.2	9.6
France	26.2	45.3	15.3	12.7	26.8	6.9
Germany	15.6	27.8	11.9	6.8	13.0	5.9
Greece	59.7	75.0	42.2	28.9	37.4	18.7
Ireland	43.2	51.0	28.5	15.3	23.5	7.9
Italy	41.5	54.8	28.9	31.8	36.9	16.6
Luxembourg	17.8	31.9	11.6	18.8	29.5	7.1
Netherlands	24.3	53.2	13.2	19.4	27.1	8.8
Portugal	42.5	50.8	28.1	42.8	52.2	22.9
Spain	35.8	44.7	24.2	29.6	38.8	17.0
Sweden	19.0	20.4	16.3	6.8	9.3	5.9
Switzerland	21.2	29.6	17.9	18.9	23.2	14.1
United Kingdom	24.5	26.2	17.7	9.1	12.1	7.0

Source : as in Table A.2.

Table A.6 **Groups with special statutory pension schemes**

	Public employees	Self-employed	Farmers	Agricultural workers	Others
Austria	X		X		Miners, notaries and self-employed in trade and industry
Belgium	X	X			Special provisions for miners and seamen
Canada					Excluded: casual workers and brief agricultural employment
Finland	X	X	X		Seasonal and maritime workers
France	X	X	X	X	Mining, railroad, public utility and seamen
Germany	X	X	X		Miners. In the old Lander, special schemes for miners, railway and postal employees, workers in cooperatives and self-employed persons.
Greece	X			X	Tradesmen and craftsmen
Italy	X		X		Industrial managers, liberal professions, railway employees, public utilities, air transport workers, journalists, self-employed artisans and merchants
Japan	X				Employees' pension insurance for private school teachers and employees, and employees of agricultural, forestry and fishery cooperative associations
Korea	X				Military personnel and private school teachers
Luxembourg	X				Railway employees
Mexico	X				Pertroleum workers and military
Norway	X				Seamen, fishermen, forestry workers, and railway employees.
Poland			X		Military personnel and police.
Portugal					Miners, longshoremen, railway workers, fishermen, and merchant seamen
Spain	X	X	X	X	Domestic servants, seamen, miners, certain professions, and members of co-operatives
Turkey	X	X	X	X	Bank, insurance company and stock exchange employees.

Source:
U.S. Department of Health and Human Services, *Social Security Programs Throughout the World - 1995,* Washington D.C.

Table A.7 **Old-age pensions: Expected replacement rates for a 55 year-old**

As a ratio to earnings

	1961					1975					1995				
	Single		Couple		Average	Single		Couple		Average	Single		Couple		Average
% of average earnings	66	100	66	100		66	100	66	100		66	100	66	100	
Australia	0.18	0.12	0.27	0.18	0.19	0.30	0.20	0.49	0.33	0.33	0.37	0.24	0.62	0.41	0.41
Austria	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Belgium	0.69	0.60	0.87	0.75	0.73	0.67	0.60	0.80	0.75	0.71	0.60	0.60	0.75	0.75	0.68
Canada	0.25	0.17	0.50	0.33	0.31	0.45	0.38	0.61	0.40	0.45	0.46	0.39	0.74	0.49	0.52
Czech Republic											0.52	0.38	0.75	0.50	0.54
Denmark	0.35	0.23	0.52	0.34	0.36	0.40	0.27	0.62	0.41	0.42	0.54	0.36	0.81	0.54	0.56
Finland	0.37	0.24	0.47	0.31	0.35	0.59	0.56	0.60	0.60	0.59	0.60	0.60	0.60	0.60	0.60
France	0.40	0.40	0.60	0.60	0.50	0.50	0.50	0.75	0.75	0.63	0.65	0.65	0.65	0.65	0.65
Germany	0.60	0.60	0.60	0.60	0.60	0.64	0.55	0.64	0.55	0.60	0.56	0.54	0.56	0.54	0.55
Greece											1.21	1.17	1.26	1.20	1.20
Hungary											0.59	0.51	0.59	0.51	0.55
Iceland											1.00	0.75	1.13	0.84	0.93
Ireland	0.35	0.23	0.58	0.39	0.39	0.26	0.17	0.43	0.29	0.29	0.36	0.24	0.59	0.39	0.40
Italy	0.38	0.37	0.40	0.40	0.39	0.62	0.62	0.62	0.62	0.62	0.80	0.80	0.80	0.80	0.80
Japan	0.26	0.22	0.29	0.26	0.25	0.59	0.48	0.61	0.49	0.54	0.54	0.44	0.62	0.49	0.52
Luxembourg											0.96	0.91	0.96	0.91	0.93
Netherlands	0.30	0.20	0.48	0.31	0.32	0.48	0.31	0.68	0.45	0.48	0.46	0.30	0.64	0.42	0.46
New Zealand	0.27	0.18	0.50	0.33	0.32	0.39	0.26	0.65	0.43	0.43	0.59	0.39	0.88	0.58	0.61
Norway	0.24	0.16	0.37	0.24	0.25	0.58	0.52	0.73	0.61	0.61	0.59	0.51	0.70	0.60	0.60
Poland											0.59	0.48	0.59	0.48	0.54
Portugal	0.90	0.80	0.90	0.80	0.85	0.70	0.70	0.84	0.84	0.77	0.80	0.80	0.86	0.84	0.83
Spain						0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Sweden	0.49	0.44	0.67	0.55	0.54	0.71	0.67	0.90	0.80	0.77	0.69	0.66	0.86	0.77	0.74
Switzerland	0.25	0.19	0.39	0.30	0.28	0.46	0.37	0.69	0.55	0.52	0.44	0.35	0.66	0.52	0.49
United Kingdom	0.31	0.20	0.50	0.33	0.33	0.31	0.21	0.50	0.33	0.34	0.46	0.39	0.64	0.50	0.50
United States	0.34	0.28	0.51	0.43	0.39	0.44	0.35	0.66	0.52	0.49	0.47	0.42	0.71	0.63	0.56

Source:

Secretariat calculations based on pension rules reported in U.S. Department of Health and Human Sevices, *Social Security Programs Throughout the World* , (various issues); Commission of the European Communities, *Social Protection in the Member States of the Community*, (various issues). Supplementory information for indivual countries included: The United States : Social Security Administration, *Annual Statistical Supplement to the Social Security Bulletin 1995* , Washington D.C.; Japan: Ministry of Welfare and Health, *Nenkin Kaikaku no Subete*, Tokyo 1994, and direct submission from the Ministry of Welfare and Health; Germany, Deutscher Bundestag -13. Wahlperiode, *Rentenversicherungsbericht 1997* , Bonn; France, Commission des comptes de la sécurité sociale, *Les comptes de la sécurité sociale - résultats 1996*, Paris; Italy, Castellino, O. (1996), "La Redistribuzione tra ed entro le Generazioni nel Sistema Previdenziale Italiano , in F. Padoa-Schioppa Kostoris (ed.) *"Pensioni e Risanamento della Finanza Pubblica"* , Bologna; Denmark: Forsikringsoplysningen, *Sociale Ydelser - Hvem Hvad & Hvornar*, Copenhagen 1995; Greece: Direct submission from the Ministry of Labour and Social Affairs; Iceland : Direct submission from the National Economic Institute; Luxembourg: Ministère de la sécurité sociale, *Aperçu sur la législation de la sécurité sociale* , Luxembourg 1995.

Table A.8 **Pensions wealth calculations: Basic data**
Panel A: Old-age pension systems 1967 and 1995: Basic parameters for single workers

		Standard retirement age (males)	Fixed component: Amount average earnings	Fixed component: Years of contr. req.	Earnings related component: Basic rate and accrual rate (per cent per year)	Earnings related component: Max. repl. rate (per cent)	Earnings related component: Started in	Flexible access to pensions: Earliest age	Flexible access to pensions: Latest age	Flexible access to pensions: Act. adjustment per year vis-a-vis standard age: Early access	Flexible access to pensions: Act. adjustment per year vis-a-vis standard age: Deferred access	Average earnings [1]
Australia	1967	65	0.22	-	-	-	-	-	-	-	-	3 007
	1995	65	0.24	-	-	-	-	-	-	-	-	34 299
Austria	1967	65	-	-		80		60	-	0	-	49 578
					30% basic rate plus 0.6% for first 10 years plus 0.9% for 11-20 years plus 1.2% for 21-30 years plus 1.5% for 31-45 years							
	1995	65	-	-	1.9% for first 30 years plus 1.5% for 31-45 years	79.5		60	-	0	-	310 363
Belgium	1967	65	-	-	2.7%	60	1955	-	-	-	-	133 033
	1995	60	-	-	1.3%	60		-	-	-	-	963 346
Canada	1967	68	0.17	-	2.5%	25	1967	-	-	-	-	5 321
	1995	65	0.14	-	2.5%	25		60	70	6	6	33 473
Czech Republic	1995	60	-	-	50% of EB [2], plus 1% for each year worked from age 26	-	-	70	-	-	4	105 648
Denmark	1967	67	0.27	-	Kr. amount differ per yr.	14.6	1964	-	-	-	-	27 342
	1995	67	0.29	-	Kr. amount differ per yr.	5.8		-	-	-	-	232 705
Finland	1967	65	0.08	-	1%		1962 [3]	-	70	-	12.5	9 218
	1995	65	0.16	-	1.5%	60		60	-	5	-	126 555
France	1967	65	-	-	0.66% (max 20% after 37.5 yrs.) plus 4 percentage points for each yr worked after 60.			-	-	-	-	12 045
	1995	60	-	-	[16]	50		-	-	-	-	135 384
Germany	1967	65	-	-	1.5% of EB [4]	-		-	-	-	-	10 983
	1995	65	-	-	Fixed am. per year of contribution (equal to 1 %)	-		63	67	0	6	54 320
Hungary	1995	60			53% of EB [5], plus 2% for 21-26 years plus 1% for 27-34 years plus 0.5% for 35 years and above	-	-	70	-	-	3	377 448
Iceland	1995	67	0.11	-	[6]	-	1974	-	-	-	-	1 396 200
Ireland	1967	70	0.21	-	-	-		-	-	-	-	728
	1995	66	0.24	-	-	-		-	-	-	-	15 426
Italy	1967	60	-	-	1.5	80		-	-	-	-	1 218 000
	1995	61	-	-	2	80		52	-	0	-	36 200 263
Japan	1967	60	-	-		-	1942	-	-	-	-	556 000
					1% of EB [7,8] plus fixed amount per year of contr. (3000Y)							
	1995	60	0.19	-	0.818% of EB [8]	-		-	-	-	[9]	4 518 611
Luxembourg	1995	65	0.10	40	1.78%	-	-	-	-	-	-	1 029 800
Netherlands	1967	65	0.29	-	-	-		-	-	-	-	10 077
	1995	65	0.31	-	-	-		-	-	-	-	56 297
New Zealand	1967	65	0.14	-	-	-		-	-	-	-	2 139
	1995	63	0.39	-	-	-		-	-	-	-	31 048
Norway	1967	70	0.20	-	2.25% of EB [10]	45	1967	-	-	-	-	27 059
	1995	65	0.18	-	1.05% of EB [10]	42		-	-	-	-	211 517
Portugal	1967	65	-	-	2%	80		-	-	-	-	19 797
	1995	65	-	-	2%	80		-	-	-	-	1 438 572
Spain	1967	65	-	-				-	-	-	-	86 000
	1995	65	-	-	60% plus 2% after 15 years	100		60	-	8	-	2 357 000
Sweden	1967	67	0.22	-	3% of EB [10]	60	1960	63	72	7.2	7.2	23 111
	1995	65	0.17	-	2% of EB [10]	60		60	70	6	8.4	198 153
Switzerland	1967	65	-	-	[11]	-		-	-	-	-	13 417
	1995	65	-	-	[12]	-		-	-	-	-	64 903
United Kingdom	1967	65	0.20	36	-	-	1978/79	-	-	-	-	1 026
	1995	65	0.20	44.1	[13]			-	70	-	7.5	15 607
United States	1967	65	-	-	[14]	-		62	-	6.6	-	6 677
	1995	65	-	-	[15]	-		62	70	6.6	5.5	29 073

Notes:

1. Current values, national currencies.
2. The monthly net earnings base in 1995 was equal to 2500 plus 0.33 times earnings between 6000 and 2500 plus 0.1 times earnings above 6000.
3. Half of the years before 1962 credited for pension purposes.
4. The earnings base is average wages as defined by the German social security administration.
5. The monthly net earnings base in 1995 was equal to 14000 plus a gradually declining coefficient from 0.9 applied to earnings above 14000.
6. The formula used embodies an implicit accrual rate of 1.8 per cent for mandatory occupational pensions, but also takes into account that means tested supplementary state pension are reduced at a rate of 45 per cent for occupational pensions exceeding 315696.
7. The earnings base was not indexed in 1967. Although legislation specified that the base was nominal life long earnings, in practice only average nominal earnings after 1958 were taken into account.
8. The percentages refer to basic wages, i.e. excluding bonuses and overtime. The share of basic wages in total earnings is assumed to be 75%.
9. Deferred access is only possible for the fixed component. The adjustment factors vary with the length of the postponement: It is 12 per cent for one year, 26 for two years, 43 for three years, 64 for four years and 88 per cent for five years.
10. The earnings base is average wages minus the "basic amount".
11. Full pension of 1000+4.4*400+2.2* (537-400) obtained after 29 years, 537 being the assumed average contributuions level.
12. Full pension of 1.04*11640+0.16*64903 obtained after 44 years .
13. The formula used is (12591/(2005-1978))*[0.25*(1988-1978)+0.22*(AGE-1988)], where 12591 is the average wage minus the lower earnings limit, and AGE is the year of retirement from 1995 onwards.
14. The computed pension level based on un-indexed average monthly earnings since 1951, the brackets between bend points and the rates applied to the different brackets is higher than the maximum of US$ 135.9 per months, so the maximum is used.
15. The formula used for monthly pensions is (0.9*426+0.32*(2423-426)), where 426 is the first bend point, 2423 is the average indexed monthly earnings. and 0.9 and 0.32 are the rates applied to earnings up to the first and second bend points respectively.
16. The formula is 0.5*[1-0.0125*q]*[(years of coverage)/37.5] where q is the number of quarters missing for full pensions.

Source: U.S. Department of Health and Human Services, *Social Security Programs Throughout the World* (various issues), OECD Unemployment Benefit Data Base. Country-specific sources listed in Table A.7.

Table A.8 (continued)
Panel B: Life expectancy for males aged 55

	1967	1995
Australia (1960-62, 1994)	19.18	23.58
Austria (1959-61, 1994)	22.80	22.55
Belgium (1959-63, 1988-90)	19.02	21.53
Canada (1960-62, 1985-87)	20.30	22.27
Denmark (1963-64, 1992-93)	20.60	21.46
Finland (1962-63, 1994)	21.61	22.10
France (1964, 1992)	19.50	22.97
Germany (1964-65, 1992-94)	19.14	21.83
Ireland (1960-62, 1990-92)	19.50	20.90
Italy (1960-62, 1992)	20.28	22.73
Japan (1965, 1994)	18.92	24.57
Netherlands (1961-65, 1992-93)	21.20	22.31
New Zealand (1960-62, 1990-92)	19.69	22.38
Norway (1956-60, 1993)	22.02	22.56
Portugal (1959-62, 1993-94)	19.37	21.58
Spain (1960, 1990-91)	20.03	23.15
Sweden (1961-65, 1994)	21.40	24.03
Switzerland (1958-63, 1993-94)	19.93	24.00
United Kingdom (1963-65, 1994)	18.70	22.37
United States (1965, 1993)	19.20	22.60

Note:
Figures in brackets denote the years used to calculate life expectancy for the pension wealth in 1967 and 1995.

Source:
United Nations, *Demographic Yearbook* 1966 and 1995, New York.

Table A.8 (continued)
Panel C: Pension contribution rates

	1967	1995
Australia	0.0	0.0
Austria	16.5	22.8
Belgium	12.5	16.4
Canada	5.9	5.4
Denmark	1.0	1.0
Finland	6.5	17.9
France	8.5	19.8
Germany	14.0	18.6
Ireland	5.2	15.7
Italy	15.8	29.6
Japan	5.5	16.5
Netherlands	10.2	14.5
New Zealand	0.0	0.0
Norway	12.8	22.0
Portugal	13.5	13.9
Spain	16.0	28.3
Sweden	6.4	19.8
Switzerland	4.0	8.4
United Kingdom	6.5	13.9
United States	7.1	12.4

Source: U.S. Department of Health and Human Resources, *Social Security Programs Throughout the World* (various issues).

Table A.9 **Disability benefit replacement ratios by family situation and earning levels**

	1961							1995						
	Single		Dep. spouse		Spouse working		Average	Single		Dep. spouse		Spouse working		Average
% of average earnings	66	100	66	100	66	100		66	100	66	100	66	100	
Australia	0.19	0.12	0.27	0.18	0	0	0.13	0.37	0.24	0.62	0.41	0	0	0.27
Austria	0.50	0.50	0.72	0.50	0.50	0.50	0.54	0.65	0.65	0.75	0.65	0.75	0.65	0.68
Belgium	0.40	0.40	0.60	0.42	0.60	0.42	0.47	0.53	0.45	0.74	0.65	0.74	0.40	(0.29)
Canada	0.25	0.17	0.25	0.17	0	0	0.14	0.36	0.30	0.36	0.30	0.36	0.30	0.33
Czech Republic								0.42	0.30	0.75	0.50	0.42	0.30	(0.22)
Denmark	0.35	0.23	0.52	0.34	0	0	0.24	0.66	0.43	0.49	0.32	0.36	0.24	0.42
Finland	0.37	0.24	0.48	0.32	0.13	0.09	0.22	0.60	0.60	0.60	0.60	0.60	0.60	0.60
France	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Germany	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.45	0.44	0.45	0.44	0.45	0.44	0.44
Hungary								0.60	0.51	0.60	0.51	0.60	0.51	(0.28)
Iceland								0.49	0.32	0.62	0.41	0.30	0.20	0.39
Ireland	0.28	0.19	0.45	0.30	0.28	0.19	0.28	0.31	0.21	0.50	0.33	0.31	0.21	0.31
Italy	0.21	0.21	0.27	0.23	0.21	0.21	0.22	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Japan	0.16	0.13	0.18	0.15	0.16	0.13	(0.08)	0.53	0.44	0.60	0.49	0.53	0.44	(0.25)
Luxembourg								0.66	0.44	0.84	0.55	0.41	0.27	0.53
Netherlands	0.79	0.52	0.79	0.52	0.79	0.52	0.66	0.70	0.70	0.70	0.70	0.70	0.70	0.70
New Zealand	0.27	0.18	0.50	0.33	0	0	0.21	0.43	0.28	0.71	0.47	0	0	(0.25)
Norway	0.24	0.16	0.30	0.20	0.24	0.16	0.22	0.58	0.52	0.65	0.57	0.58	0.52	0.57
Poland								0.55	0.38	0.55	0.38	0.55	0.38	0.47
Portugal	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.76	0.74	0.70	0.70	0.72
Spain								0.75	0.75	0.75	0.75	0.75	0.75	0.75
Sweden	0.49	0.44	0.73	0.60	0.49	0.44	0.53	0.69	0.66	0.86	0.77	0.86	0.77	0.77
Switzerland	0.25	0.19	0.34	0.27	0.25	0.19	0.25	0.44	0.35	0.58	0.45	0.44	0.35	0.43
United Kingdom	0.31	0.20	0.50	0.33	0.31	0.20	0.31	0.29	0.19	0.47	0.31	0.29	0.19	0.29
United States	0.34	0.28	0.34	0.28	0.34	0.28	0.31	0.47	0.42	0.47	0.42	0.47	0.42	0.45

Note:

Figures in parentheses are averages over a ten-year period; if old-age pensions become available within the ten-years from 55, this will be reflected in a lower average as disability benefits are paid for less than 10 years in this case.

Source: Calculations, based on the same sources as listed in Table A.8.

Table A.10 **Evolution of unemployment-related benefit replacement rates, 1995**
Single worker on average earnings leaving employment at the age of 55

	Age									
	55	56	57	58	59	60	61	62	63	64
Australia [1]	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Austria [2]	0.34	0.32	0.32	0.32	0.32	0.65	0.65	0.65	0.65	0.65
Belgium [1]	0.42	0.28	0.28	0.28	0.28	-	-	-	-	-
Canada [3]	0.54	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Denmark [4]	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Finland [5]	0.65	0.66	0.66	0.66	0.66	0.60	0.60	0.60	0.60	0.60
France [1]	0.56	0.56	0.49	0.35	0.25	-	-	-	-	-
Germany [6]	0.34	0.34	0.33	0.30	0.30	0.49	0.49	0.49	0.49	0.49
Ireland [7]	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Italy [8]	1.00	0.80	0.80	0	0	-	-	-	-	-
Japan [1]	0.29	0	0	0	0	0	0	0	0	0
Netherlands [9]	0	0	0.35	0.70	0.70	0.70	0.70	0.70	0.70	0.70
New Zealand [1]	0.26	0.27	0.27	0.27	0.27	0.27	0.27	0.27	-	-
Norway [1]	0.62	0.49	0.45	0.16	0	0	0	0	0	0
Portugal [10]	0.65	0.65	0.46	0.28	0.28	0.70	0.70	0.70	0.70	0.70
Spain [11]	0.65	0.25	0.25	0.25	0.25	-	-	-	-	-
Sweden [1]	0.74	0.56	0	0	0	0	0	0	0	0
Switzerland [1]	0.70	0.38	0	0	0	0	0	0	0	0
United Kingdom [1]	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
United States [12]	0.27	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04

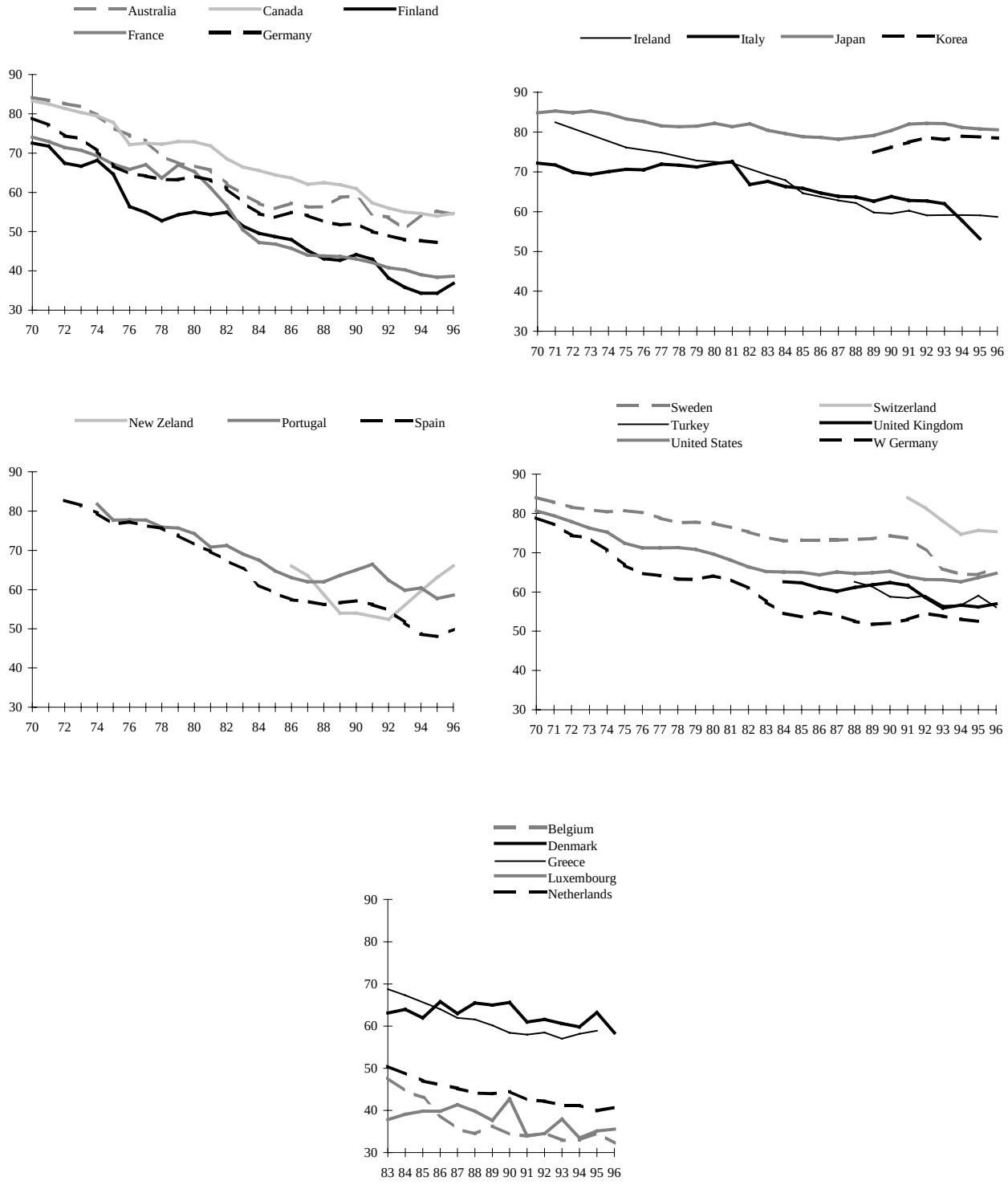
Notes:

" -" denotes that old-age pensions can be accessed at that age.

1. Unemployment insurance (UI) or assistance (UA).
2. 30 weeks of UI, followed by UA up to 60 and unemployment pensions (UP) from 60 onwards.
3. 50 weeks of U,I followed by social assistance benefits.
4. 7 years of UI, followed by "post retirement" benefits.
5. 5 years of UI, followed by UP.
6. 2 2/3 years of UI, followed by UA up to 60, and UP from 60 onwards.
7. 1 1/2 years of UI, followed by UA.
8. Extended "mobility" benefits (up to 3 years for workers of 50 years age and older).
9. Special rules concerning duration apply for those becoming unemployed at 57.5 or older; for those younger than 57.5 the duration is limited to 2 1/2 years.
10. 30 months of UI, followed by UA up to 60 and UP from 60 onwards.
11. 1 year of UI, followed by social assistance benefits up to 60.
12. 6 months of UI, followed by social assistance.

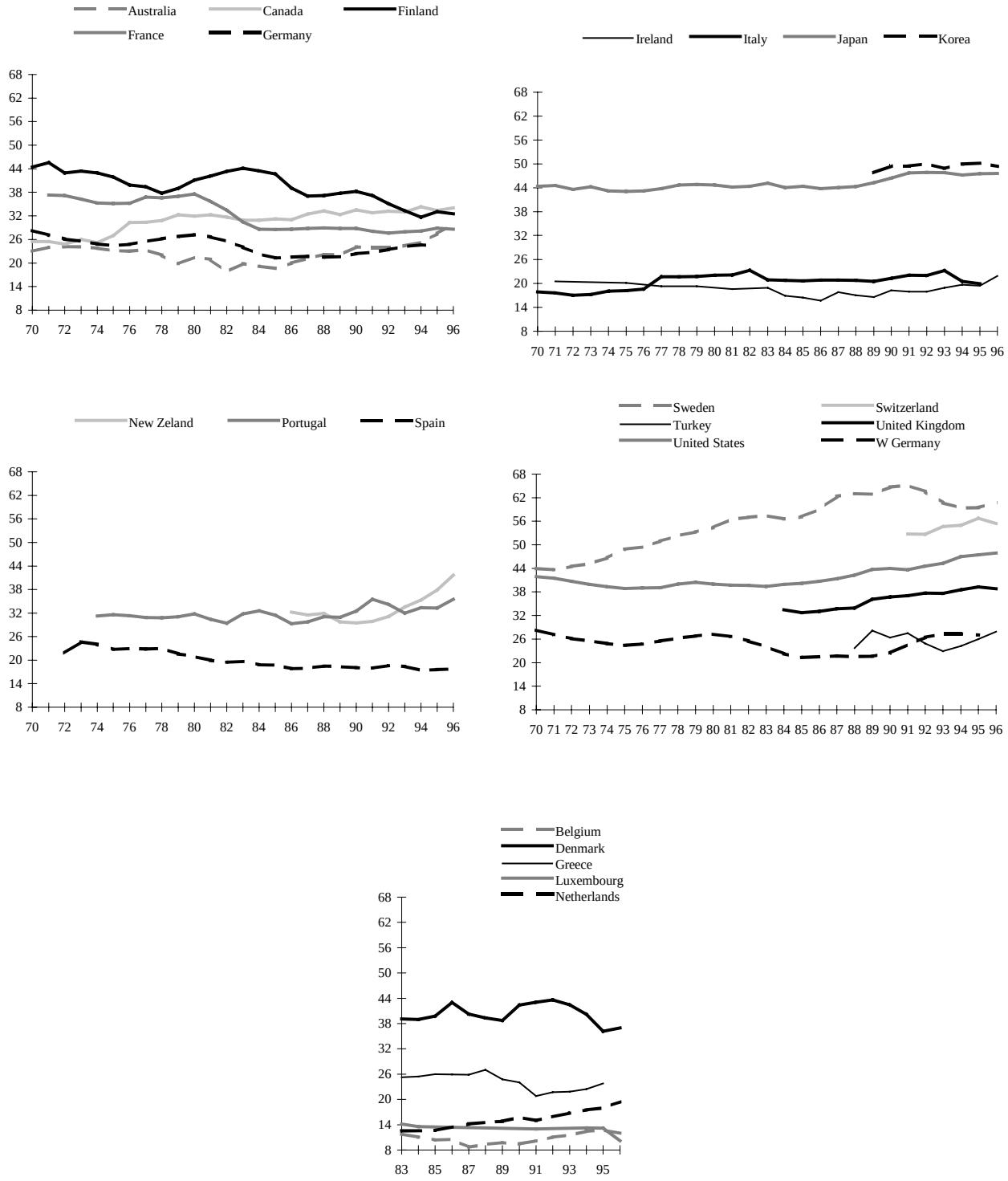
Source: OECD Unemployment Benefit Data Base, sources listed under Table A.8.

Figure A.1 **Older workers (55-64) as a percentage of older population (55-64)**
Men



Source:
OECD, *Labour force Statistics.*

Figure A.1 (continued) **Older workers (55-64) as a percentage of older population (55-64)**
Women



Source:
OECD, *Labour force Statistics.*

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