Cross-country comparisons of pensioners' incomes

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

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SUMMARY

This report surveys a dozen international comparative studies of poverty, income distribution and the elderly in OECD countries. It updates a previous Department of Social Security report - Whiteford and Kennedy, 1995, based on data from the mid- to late-1980s - including information up to the mid-1990s.

The report addresses a series of questions. What level are the incomes of the elderly relative to the population as a whole? How has this changed over the past two decades? How many of the old are poor? How many of the poor are old? Are the oldest of the old poorer than younger pensioners are? How do widows fare? What is the mix between public and private sources of income? Do the elderly poor remain poor? There is also a discussion of methodological issues.

The results show that the incomes of the elderly are typically around 80 per cent of incomes of the populations as a whole. In most countries, this ratio has been increasing over the past two decades. Although there remain pockets of poverty among the elderly, most studies show that the old are represented proportionally or under-represented among the poor. The papers present conflicting pictures of the position of the United Kingdom. There is, however, no consistent evidence that pensioners in the United Kingdom are better or worse off than their counterparts overseas.

There are several significant measurement issues and methodological differences between existing studies of cross-country comparisons of pensioner incomes. The inclusiveness of the income measure, the population reference group, unit of measurement (household or family) and choice of equivalence scale have significant impacts on the ordering of different countries on measures of the economic well-being of pensioners (Chapter 1).

A cross-study comparison of *average* replacement rates - pensioners' incomes as a percentage of population incomes - suggests that the United Kingdom is normally in the middle of the bottom half of the distribution. The most recent OECD study - based on data from the mid-1990s - puts the United Kingdom 11th out of 15. The average pensioner replacement rate is 78 per cent in the United Kingdom, compared with a 15-country mean of 83 per cent (Chapter 2).

However, this result is sensitive to the comparison group. In one study, for example, the United Kingdom's replacement rate relative to the population is five percentage points below the mean but just two points below when measured relative to older workers. Separating pensioner couples and single pensioners also alters the ordering, and implies (as indeed turns out to be the case) that choice of equivalence scale also matters (Section 2.1).

Observed pensioner incomes decline with age in most countries, including the United Kingdom. This is partly explained by a cohort effect. Each successive generation of retirees had higher earnings during their working life, which increases rights to earnings-related pensions, such as occupational schemes in the United Kingdom and increases their ability to make voluntary provision for retirement. In addition, pension schemes in many countries are not yet mature. In the United Kingdom, the value of benefits under the State Earnings-Related Pension Scheme (SERPS) only peaked for new retirees in 1998. Improvements to the portability of occupational plans in the 1970s and 1980s have yet to feed fully through to benefits (Section 2.2).

There are many difficulties in examining *absolute* living standards of pensioners. Such comparisons are based on purchasing power parities to avoid distortions from fluctuating exchange rates. They suggest that North American pensioners do better than European pensioners do, with the United Kingdom close to, but below, the European average. However, the distribution of absolute incomes is more compressed in the United Kingdom than other countries, with the exceptions of the Netherlands and Sweden (Section 2.3).

Analysis of absolute standards should, for comparability with replacement rate studies, use purchasing power parities adjusted by an equivalence scale (as in recent work at the Luxembourg Income Study). Such adjustments alter the position of other countries relative to the United Kingdom considerably. For example, Swedish pensioners would become less well off than in the United Kingdom and Italian pensioners better off, than with unadjusted purchasing power parity comparisons (Section 2.3).

We examine the correlation of replacement rates for different countries across pairs of studies. Correlations are generally positive, but not strong except 'within house' (the successive OECD studies). Once the average replacement rates are disaggregated (e.g. by household type) the correlations become weaker. Choice of equivalence scale affects the *absolute* replacement rates but does not significantly alter the rankings of different countries (Section 2.4).

Relative to the rest of the population, pensioners are typically under-represented in the bottom one and two deciles, and over-represented in the third to fifth. This also holds in the United Kingdom. One implication is that the choice of poverty line in poverty comparisons will be crucial to countries' rankings (Section 3).

We examine pensioner income poverty rates in different countries and how the ordering of countries is affected by different poverty lines. The United Kingdom is generally in the middle of the distribution of poverty rates. Nevertheless, the sensitivity to assumptions is indicated by a comparison of the Bradshaw-Chen study, which adopts an idiosyncratic treatment of housing benefit, with the Atkinson *et al.* study, both of which are based on Luxembourg Income Study data. We again examine the correlation of rankings given by different studies. The United Kingdom tends to have lower poverty rates in more recent than in earlier studies (Section 4.1).

A second measure of relative poverty is the share of the poor that are elderly, as opposed to the share of the elderly that are poor. The studies again (with the exception of Bradshaw-Chen) point to a low-to-middle poverty share in the United Kingdom within the country rankings (Section 4.2).

In terms of pensioner income inequality, the United Kingdom lies in the middle of the distribution of OECD countries. Countries with a 'flat' component to their public pension scheme tend to have lower income inequality, whereas earnings-related public pensions (the 'Bismarck' system) have greater inequality. This finding remains even when we include other, private sources of income (Chapter 5).

Replacement rates among pensioners have increased at a faster rate between the mid-1980s and the mid-1990s than an OECD 14-country average. However, this growth is largely among younger pensioners (65-74) rather than older pensioners (75+) (Section 6.1).

Replacement rates in the United Kingdom rose during the 1980s, as they did in other countries. Pensioner poverty in the United Kingdom fell sharply in the 1970s and again in the early 1990s (Section 6.2).

In all countries surveyed, state benefits account for almost all the income of the lowest quintile of pensioners. However, income shares from different sources vary widely across countries in the upper quintiles. In continental European countries, pensioners in the highest income groups also receive the vast majority of their income from the state. Elsewhere, private pensions and voluntary savings make up a sizeable proportion of the income of these richer groups (Section 7).

We examine some preliminary findings from studies on the 'persistence' of poverty among pensioners. Strong measures of persistence rely on

long panels, which are generally not available. Over shorter periods, pensioners are moderately more likely to be persistently poor than other population groups. One study of the United Kingdom suggests that just under a quarter of single pensioners are persistently poor, with a much lower fraction among couples (Section 8.1).

Widowhood is associated with a large fall in income, but on an equivalised scale, the standard of living may not fall. However, widows are often poorer because of differential mortality by income of deceased spouse (Section 8.3).

A major limitation of the standard measure of pensioner 'income' is that it is not measured as a finite life annuity. An ideal measure of 'command over resources' would incorporate the stock of wealth to which the household has access, adjusted for the effect of inflation. Thus, the rundown of accrued private pension wealth (dis-saving) is treated as 'income' whereas housing equity gains (wealth acquisition) are ignored. This requires comparisons of income and wealth of the elderly. There are implications for the ordering of countries with respect to pensioners' incomes. For example, Australian pensioners tend to have below-average incomes and above-average wealth (Section 9.1).

Housing wealth is an important component of imputed income for many older households: its use, for example, could reduce significantly measured poverty among very elderly households outside the poorest quintile. However, the equity release market is quite thin. The evidence that pensioner households use house moves to release equity in the United Kingdom is strong, but many elderly households are reluctant to move at all, even when they have high potential values of housing equity. Large houses (relative to income) are both a blessing and a curse, from the point of view of pensioner well-being (Section 9.2).

The absence of datasets that combine information on income and expenditure in most countries prevents a cross-country comparison of the impact of indirect taxes on pensioners' relative living standards. Data for the United Kingdom show that pensioners pay around two per cent of income less in indirect taxes than the working age population. Since indirect tax regimes differ substantially between OECD countries, we would expect to see some re-orderings if indirect taxes were taken into account (Section 9.3).

The elderly tend to benefit from publicly provided healthcare more than people of working age, but the value of this provision varies between different countries. Working age people tend to gain from publicly provided education, little of which goes to the elderly. Taking these two spending programmes together, the elderly tend to benefit a little more on average than people of working age. The impact in the United Kingdom is similar to the average across countries. Inclusion of in-kind incomes of this sort has little effect on the United Kingdom's ranking with respect to the living standards of the elderly (Section 9.5).

OVERVIEW OF THE REPORT

The main goal of retirement-income systems of all types is to ensure that the elderly have the resources to support an adequate standard of living.[1] How can we measure countries' success at achieving this goal?

This report compares current pensioners' incomes with current workers' incomes to assess the living standards of the elderly against those of society as whole, both in the United Kingdom and in other OECD countries.[2] It surveys the existing comparative literature by drawing on data from numerous international studies, typically relating to the early and mid-1990s. Most OECD countries are represented in at least one of these analyses. It seeks to provide an answer to the question: how do pensioners in the United Kingdom fare relative to those of other, comparable, countries?

Different OECD countries have adopted a variety of retirement income systems, varying from schemes with comprehensive earnings replacement through to floor-based and flat pension formulae. The extent of private-sector involvement also varies considerably. The main policy issue that stems from this comparison is: how well do different systems fare in delivering benefits to pensioners? Ultimately, however, whatever the structure of public sector benefits and the public-private mix, more generous pension benefits as a share of total output require higher taxes or higher contributions from those of working age. The same factors - contribution rates as a share of payroll, the support ratio of workers to pensioners and public budgetary policies - underpin the treatment of pensioners whatever the retirement income system.[3]

We address many specific questions in this survey. We begin by examining the methodological questions involved in making such comparisons, such as different measures of household income, measures of income poverty etc. (Chapter 1). Chapter 2 compares average pensioner incomes to average non-pensioner and population incomes ('replacement rates'). These averages, however, can disguise a range of differences between different pensioner households in the two groups. Chapter 2 also looks at replacement rates for pensioners disaggregated by sex, age and marital status. Chapter 3 looks at how pensioners fit into the population income distribution.

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[1] There may of course be other goals, since retirement income systems have an impact on household labour supply: see Mulligan (2000).

[2] An alternative methodology is to estimate future hypothetical pension entitlements for a range of different characteristics. For examples of this approach, see Aldrich (1982), Blöndal and Scarpetta (1998), Eurostat (1993), Table 1.1 of Johnson (1999) and McHale (1999).

[3] Disney and Johnson (forthcoming).

Chapter 4 concentrates on the bottom end of the income distribution. It asks: relative to standard poverty benchmarks, how many of the old are poor? It also asks the reverse question: how many of the poor are old? Answers to both are an essential input to anti-poverty policy.

Next, in Chapter 5, the report looks at the distribution of income among pensioners rather than relative to the population as a whole. Chapter 6 then examines income trends: are today's pensioners better off than in the past? Have they fared better or worse than workers have? Chapter 7 examines the income sources of the elderly as a whole and at different points of the income distribution. Chapter 8 of the report explores individual income dynamics in retirement: are the elderly poor persistently poor? Chapter 9 looks at attempts to broaden the income concept beyond the standard of cash and near cash incomes. It looks at measures of 'in-kind' incomes from public services - such as health and education - and how they affect the living standards of different demographic groups. It also explores pensioners' wealth as a way of capturing a wider concept of command over resources.

Finally, Chapter 10 draws together the threads. It answers the broad question: how do UK pensioners fare compared with their counterparts in other European countries? It asks whether differences in incomes, replacement rates and poverty across countries can be explained by 'real' differences or by differences in methodology. It also asks: what kinds of data are we lacking in order to provide the definitive answer on this issue?

One caveat is necessary. This procedure of examining the current income of pensioners, and in particular, of comparing incomes with those of current workers must be used with care. In a contribution-based system, today's pensions depend on past contributions, past earnings and indeed the past savings behaviour of today's pensioners. They also depend on the past rules of the pension system, which have changed significantly in most European countries in the last few years - and not least in the United Kingdom. This will affect the pattern of pensioners' incomes, now and in the future. One illustration is that in an immature scheme, incomes of the elderly may be observed to decline sharply with age. However, it would be a mistake to infer from this that we should change all the eligibility criteria currently in place. For example, many married women chose to pay the reduced rate of National Insurance contribution in the past and this has an impact on their pensions today. In general, too, past treatment of widows and spouses has a large impact on current entitlements. Some current policies - for example, how we link pensions in payment to costs and/or standards of living - impact on living standards today. Other policies - for example, the effects of Home Responsibilities Protection - may take many years to exert their full effects. Many reforms undertaken now to improve pensioner living standards are likely to come to fruition only in many years' time.

Finally, it is important to note that the most recent data underlying the different studies are from the mid-1990s.[4] Thus, recent policy reforms - both in the United Kingdom and elsewhere - are not reflected in the results.

[4] Appendix A describes in detail the data sources underlying the different studies.

1 MEASUREMENT ISSUES

Before turning to the empirical results, this Chapter provides a guide to some of the measurement issues we encounter later. How can one define poverty and how can one measure it? Many of these issues have themselves generated a large literature. The treatment here, for reasons of space, is therefore cursory.

1.1 What is poverty?

Poverty is a very broad concept and the many dimensions of social exclusion and deprivation can only be captured with a range of indicators.[5] The studies surveyed in this report, however, focus on income as a definition of well-being. Here, therefore, we use the term 'poverty' as shorthand for low income while acknowledging that low income is alone unable to capture all the facets of poverty and deprivation.

There are two basic approaches to defining poverty: an absolute standard and a relative standard.[6,7] One type of absolute standard compares households' resources with a minimum level of consumption to support basic needs (food, shelter, etc.).[8] Another type compares peoples' incomes with the minimum, safety-net income specified by the social assistance system.[9]

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[5] See, for example, Department of Social Security (1999, 2000*e*). The Joseph Rowntree Foundation has also looked at broader measures of deprivation (Gordon *et al.*, 2000 and Howarth *et al.*, 1998). The Irish government, too, includes a number of facets of social exclusion in its anti-poverty strategy: see Department of Social, Community and Family Affairs (1998, 2000).

[6] Madden (2000) adopts a general approach combining both relative and absolute methods. He calculates an income elasticity of the poverty line, which sets how quickly the poverty threshold grows over time as incomes grow, based on the change in broader measures of deprivation over time.

[7] A third option is the so-called 'subjective' approach, which asks the population what they think is an adequate, minimum income. Typically, the result is much higher than official poverty lines. Examples include Colasanto, Kapteyn and van der Gaag (1984), Danziger *et al.* (1984*c*), De Vos and Garner (1991), Goedhart *et al.* (1977), Kapteyn, Kooreman and Willemse (1988), Piachaud (1987), Van den Bosch *et al.* (1993), Van Praag *et al.* (1982) and Walker (1987). In international comparisons, this approach shares the problems of any absolute standard, with the added problem of very different popular views of what constitutes poverty both over time and between countries.

[8] The poverty line in the United States, for example, is based on the cost of a minimum basket of goods from 1959 data uprated in line with the consumer price index.

[9] Austria and Germany define poverty relative to social-assistance minima. Gustafsson and Lindblom (1993) is an international study of income poverty using such thresholds.

The second approach assumes that poverty is relative: poverty is defined in comparison with the living standards of society as a whole. Over the long term, governments have tended to increase the safety-net level of income faster than prices, implying that societies' (or at least governments') views of poverty change over time. Absolute poverty lines set as a minimum consumption basket become out of date. When real incomes are growing, poverty measured against a constant real standard will tend to decline, although there will also be high levels of cyclical variation.[10]

Minimum, absolute poverty standards also make little sense in international comparisons. First, basic needs probably differ between countries. Secondly, the chosen poverty line has to be translated into different currencies. Market currency rates are very volatile, but even purchasing power parities - which compare the cost of a common consumption basket - are inappropriate, because they aim to equalise the cost of population expenditure and not the consumption of the poor.[11] Thirdly, countries' average incomes differ. Even within the European Union, poverty rates measured against a benchmark of 50 per cent of EU-wide average consumption varied from under five per cent in Belgium, Denmark and the Netherlands to nearly 70 per cent in Portugal.[12]

Most international studies, therefore, measure poverty as a relative concept, typically the proportions with incomes below some ratio of the average income.[13] Comparisons of the characteristics of the poor also often define the poor as some part of the income distribution, such as the bottom fifth. (This obviously makes no sense in comparing aggregate poverty rates because they are, by definition, 20 per cent in each country.)

1.2 Income or consumption?

Nearly all the studies reported here use income as a measure of welfare. Other analyses, however, have used a measure of consumption.[14]

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[10] The distinction between relative and absolute standards is not always clear. Jännti and Danziger (2000), for example, define a relative view as 'one in which the rules for identifying the poor change as (some) other economic conditions change'. But they go on to argue that changes in economic conditions can redefine an absolute view of poverty.

[11] Dowrick and Quiggin (1994).

[12] Eurostat (1990). See also De Vos and Zaidi (1998).

[13] Smeeding and Torrey (1988) is one exception: an international study using an absolute definition of poverty. The authors apply the United States poverty line, adjusted by purchasing power parities, to a range of OECD countries.

[14] Ramprakash (1994) and Eurostat (1990) report that consumption-based measures show a very different picture from income measures of relative poverty in different countries of the European Union. For a discussion of the merits of the two indicators, see also Cutler and Katz (1992), Johnson and Shipp (1997) and Slesnick (1993, 1994) on the United States; Blundell and Preston (1995) and Goodman and Webb (1995) on the United Kingdom; and Van den Bosch and Marx (1996) for estimates for 14 OECD countries. Smeaton and Hancock (1995) look specifically at trends in pensioners' expenditure in the United Kingdom. Bierings (2000) compares consumption of elderly and non-elderly households for EU member states.

Household expenditure is a more direct measure of living standards. If people's spending plans are based on expected lifetime income, then consumption might give a better picture of command over resources than annual income.[15] Students, for example, might have low current incomes, but finance a higher level of expenditure through borrowing. Nevertheless, a household with a relatively high income, but high saving, would have relatively low current consumption. Its members might even count as poor, despite the greater command over resources and consumption possibility than a household with a lower income, lower saving and the same current consumption. This is particularly pertinent because older households do seem to cut consumption expenditures on retirement (Banks, Blundell and Tanner, 1998).

Consumption can be a more robust indicator of living standards when incomes vary. This can be important for particular groups, such as the self-employed[16], and can also make a difference in time-series studies. In the United Kingdom, for example, the inequality of incomes has increased much more than inequality of household expenditure. This could be interpreted as the effect of greater income volatility, which households absorb by smoothing their consumption over time. This increased income risk should reduce households' welfare, and this is reflected in studies based on expenditure when households increase their precautionary savings against future income shocks.[17]

Household expenditure can also be a better welfare indicator when incomes are misreported. Consumption data, for example, give a different picture of the living standards of the self-employed than income data.[18] Nevertheless, measurement is also a problem with using consumption. For example, 'lumpy' purchases, such as durable goods, can distort the measure, although averaging over sufficient households can mitigate this effect. There are many other problems in interpreting household expenditure data as the measure of consumption appropriate for distributional studies.[19]

1.3 Defining income

The data underlying the papers we survey here are based on similar concepts of income. This comprises earnings, public transfers, investment incomes, private pensions etc. Typically, the studies exclude all (or at least some kinds of) capital gains, because the receipt of a capital gain in a particular period reflects the accrual of gains over the period an asset was held. Including such gains would artificially broaden the income

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[15] Some of the arguments between income and consumption as an indicator are therefore similar to the question of the relevant accounting period (discussed in Section 1.9 below).

[16] Baekgaard (1998) finds large numbers of farmers reporting negative incomes: he argues that consumption is a better indicator of living standards.

[17] Kimball (1990).

[18] See, for example, Baker (1993) on the United Kingdom.

[19] Kay, Keen and Morris (1984).

distribution. Incomes in kind are also excluded. Chapter 9 looks at attempts to measure the value of benefits in kind and their effect on various different measures of relative living standards of the elderly.

Another problem in defining incomes is the treatment of lump-sum distributions from private pensions, which is naturally very important for assessing the relative economic status of the elderly. In Australia, most private pensions are received as a lump sum rather than an annuity stream.[20] Lump sums are also important in Japan, the United Kingdom and the United States. Usually, these are excluded because income is often defined as only recurrent receipts. The rationale is that such one-off receipts are probably consumed over a longer period than the year in which they were paid.[21] The result of including lump sums would be a small group of elderly at retirement with very large measured incomes. However, their exclusion will result in measured replacement rates lower than their 'true' value.

Nearly all the results show incomes net of personal income taxes and social-security contributions. Other taxes are ignored. The most significant omission is indirect taxes, which include excise duties and general consumption taxes (such as value-added tax). This exclusion affects the results because different goods and services are taxed at different rates. Since consumption patterns vary with both income and age, the indirect tax burden will also vary. This should also have an impact on international comparisons, since European governments, for example, collect a much bigger portion of revenues from indirect taxes than countries without a value-added tax, such as the United States.[22]

1.4 The unit of measurement: households or families?

Although many elderly people live alone or with their spouse, others live in larger households. In addition, most of the results compare the elderly with the population as a whole. Some studies are based on 'family' or 'income' units, which consist of a single person or couple and any dependent children. An elderly couple living with a grown-up child and his or her spouse count as two units under this approach, and their incomes are treated separately. Other studies are based on household-level incomes.

The living arrangements of the elderly differ significantly internationally, even between OECD countries. Table 1.1 shows, for example, the proportion of the elderly living with their children. The proportions are high in Japan and southern Europe and very low in the Nordic countries and the Netherlands. In most countries, there has been a substantial

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[20] See Bateman and Piggott (1999, 2001) and Doyle and Piggott (2001).

[21] Hicks (1946) proposed this differentiation between recurrent and one-off receipts. The Haig-Simons definition of income would include such lump-sum payments. See the discussion in Everaers, van der Laan and McDonald (2000) and Chapter 9 of this report.

[22] See OECD (1999). Adema (1999) and Adema *et al.* (1996) show how differences in indirect taxes affect measures of social expenditures.

decline over time. In the United Kingdom, for example, a third of the elderly lived with their children in the early 1960s, twice today's level.

The major issue in the choice between the household and the family as the unit of measurement is the degree to which people share resources in the household. Some of the household's resources can be enjoyed equally, but members probably do not share their entire incomes equally (or the entire costs, of housing, for example).[23] The 'true' measure of the welfare of an individual is likely to lie somewhere between a share of the household income and their own (or their own family unit's) income.[24]

Table 1.1 Proportion of over 65s living with their children

	Per cent
Japan	65
Italy	39
Spain	30
Austria	25
France	17
United Kingdom	16
United States	15
Finland	14
Germany	14
Norway	11
Netherlands	8
Sweden	5
Denmark	4

Note: data for various years between 1987 and 1990.

Source: OECD (1994)

The results of measures of income inequality and poverty are quite sensitive to the choice of unit: typically, the smaller the unit of measurement, the larger is measured poverty and inequality. Goodman, Johnson and Webb (1997), for example, report that using the family unit in the United Kingdom would increase the proportion of the population with below half-average incomes by a third compared with household-based measures.

1.5 Equivalence scales

Closely related to the issue of measurement unit is the way in which welfare is assigned to individuals based on the consumption or income of

[23] Empirical tests of sharing, based on women's labour supply, for example, reject the hypothesis that the household can be treated as a single utility-maximising unit (Thomas, 1990; McElroy, 1999). Theoretical studies, based on household-bargaining models, show that the equal-sharing outcome is a special case (Browning *et al*., 1994). Women's increased participation has led to a more equal distribution of income within households (see Webb, 1993, on the United Kingdom), which may have changed the intra-familial distribution of resources.

[24] The empirical literature on this question is small due to the paucity of data on intra-household income allocation. Discussions of the issue include Borooah and McKee (1994), Haddad and Kanbur (1990), Jenkins (1991), Lazear and Michael (1988), Smith *et al*. (1991) and Woolley and Marshall (1994). There is a large theoretical literature: see Becker (1981*a*,*b*) and Sen (1984), for example.

the household. This makes implicit assumptions both about how resources are shared and about how the cost of living varies with household size. Studies usually assume a degree of economies of scale: not quite that 'two can live as cheaply as one', but generally that two people with an income of around 1½ times a single person have the same living standard. This adjustment is called an equivalence scale.

The choice of equivalence scale has an important effect on comparisons of incomes of the elderly with population incomes, because household size varies systematically with the age of the household head.[25] Older people tend (in most countries, especially richer ones) to live in smaller households (either alone or with their spouse) than people of working age.[26] In poorer countries, the issue is still more complex, because the elderly mainly live in multi-generational households. Deaton and Paxson (1995) argue: 'Conclusions about the living standards of the elderly in India are…less determined by the data than by assumptions about who gets what and how poverty lines vary with household composition. Although it is perhaps less obvious in the US, and certainly less attention is paid to it, the same is true.' Appendix C of the report provides a more detailed analysis of the equivalence-scale problem.

1.6 Defining the elderly

There are even many different answers to the simple question of: who are the elderly? Where possible, we have taken samples based solely on age (typically 65).[27] Some studies use alternative criteria, including labour-market status or pension-benefit receipt. However, a small minority of elderly households in most countries has income from earnings, and these tend to be among the higher-income elderly. A sample based on pension benefit receipt misses people who are ineligible, and many of these are on the lowest incomes. Choosing a sample solely by age avoids these distortions.

Another sampling issue is the institutional population. Nearly all the data sources underlying the studies reported here sample only the household population. However, many of the elderly in industrialised countries live in institutions: nine per cent in the Netherlands, for example, and seven per cent in Finland and Canada. Rates of institutionalisation vary internationally, with the elderly infirm in some countries living

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[25] Significant studies of equivalence scales include Aarberge and Melby (1998), Buhmann *et al.* (1988), Deaton and Muellbauer (1986), De Vos and Zaidi (1997) and Lanjouw, Milanovic and Paternostro (1998).

[26] In some countries, young, single people are an exception - they often live alone - although in others younger workers mainly stay with their parents.

[27] Age 65 is the most common state pension age in OECD countries and recent increases in pension age mean that most OECD members will converge on this level in the future (Disney and Whitehouse, 1999 and World Bank, 1999). However, the majority of people typically retire before this age: some studies therefore include people under 65 who are not in work.

mainly with relatives rather than in residential or nursing homes. Even among OECD countries, less than one per cent of over 65s in Turkey live in institutions and just two per cent in Portugal.[28] The rate in the United Kingdom - 5.1 per cent - is around the average for 22 OECD countries.

1.7 Differential longevity

Life expectancy is far from uniform: longevity differs systematically between the sexes and between income groups. These differences must be borne in mind when interpreting many of the results. Since women tend to live longer than men do, they make up the majority of the old. Nevertheless, as general life expectancy increases, the proportion of men among the elderly increases. This also means that the proportion of married couples in the pensioner population will increase over time. Furthermore, richer countries have recently seen a narrowing of the gender-longevity gap, adding to this effect. This also influences comparisons of incomes by age: the oldest of the old are predominantly single women. The group of younger old contains more couples and more men. Increasing divorce rates have the opposite effect. Pensioners may now be less likely to be widowed, but they are more likely to be divorced.

1.8 The shape of the income distribution

Income distributions vary both between countries and in the same country over time. Some studies measure inequality and poverty among the elderly against the population income distribution: for example, the proportion of pensioners that is in the poorest fifth of society. This implies a very different living standard relative to the national average in countries with a broad income distribution - such as the United States - than in countries with a more equal distribution of incomes - in continental Europe, for example. This can be illustrated by the ratios of the value of the twentieth percentile of the income distribution to the median and the mean income in some example countries:[29]

	Sweden	United Kingdom	United States
P20/median	68%	61%	53%
P20/mean	62%	51%	43%

[28] OECD (1996*a*), Table 3.1. Evans (1995) looks at the incomes of the institutional population in the United Kingdom.

[29] Source: Förster and Pellizzari (2000), Table 2.2. Based on samples of the whole population. The P20 value relates to the upper bound of the lowest quintile of the income distribution (not to the mean of the quintile income).

Alternative measures - for example, against a proportion of national average income - are more robust to these problems.

Some studies use proportions of the median rather than the mean income in these measures. It is well known that the mean is less robust to high-income outliers than the median. Moreover, the median income is always, in practice, lower than the mean because income distributions are positively skewed. These differences in measure again can affect the results significantly. This should be borne in mind when interpreting the data.

1.9 Time period of measurement

Most surveys underlying the studies use annual incomes. Others, including surveys in Australia, Germany and the United Kingdom aggregate shorter periods (weeks or months) into annual equivalents, although some incomes - from self-employment and capital, for example - are measured over longer periods. Shorrocks (1976) showed that measures of inequality increase the shorter the period over which incomes are measured under quite general conditions. The effect on poverty measures depends on the precise threshold and the density of the income distribution around that point (Ravallion, 1988). Empirical studies have tended to show small effects.[30] Other studies have aggregated incomes over longer periods, arguing that lifetime or long-term poverty is a better measure of 'true' deprivation than short-term measures. This question is considered in Chapter 8.

1.10 Interpreting replacement rates

The results in this report are often presented as 'replacement rates': the ratio of elderly incomes to non-elderly or population incomes. This of course differs from individual replacement rates, which are measured against the pre-retirement incomes or earnings of an individual pensioner. The denominator used in the different studies varies: some use non-pensioners while some use the population. The latter will give lower pensioner replacement rates if pensioners' incomes are less than the population as a whole. Furthermore, the effect will increase the larger is the gap between the two and the larger the proportion of elderly in the population. One study compares incomes of the elderly with older working age households to give a replacement rate relative to pre-retirement income. (This is therefore a little closer to measures of individual replacement rates.) This will typically reduce measured replacement rates, because these middle-aged groups tend to have higher earnings and incomes than the working-age population as a whole.

The final and most complex issue is interpreting the magnitude of replacement rates: what does it mean for living standards if we say that

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[30] Böheim and Jenkins (2000), Morris and Preston (1986) and Nolan (1987) on the United Kingdom; Ruggles (1990) and National Research Council (1995) on the United States.

pensioners enjoy an average of 80 per cent of the population income? For example, people no longer face the costs of work when they are retired (commuting, special clothing etc.). A replacement rate of 100 per cent would therefore probably reflect a sizeable increase in living standards. Many studies have shown a large drop in consumption at the *time of retirement*. However, it is difficult to isolate the impact of misplaced expectations of retirement income from any desired reduction in spending.[31] Younger pensioners, for example, may also derive utility from increased leisure time, particularly if the requirement of their pre-retirement job prevented them from adjusting working hours to optimise the trade-off between work and leisure. Increased leisure time also provides opportunities for home production (DIY, cookery, gardening etc.) that might not have been possible before. These add to utility but are not measured in conventional distributional studies.[32]

Other important questions include the pattern of marginal utility of income with age.[33] For example, the very elderly may be unable to enjoy expensive leisure pursuits, although they may have large health and care costs. The costs of disability are ignored.

Some studies have shown that the elderly tend to spend less than their income, accumulating rather than decumulating savings as the lifecycle model of consumption would suggest.[34] This points to a higher than desired replacement rate in retirement, but it may reflect the elderly undoing the degree of annuitisation of their wealth in public and private pension schemes.[35] For example, there may be precautionary motives for saving (healthcare costs etc.) or a desire to bequeath wealth to children[36] or to charity.

There is also a measurement problem because household surveys exclude the institutional population (see Section 1.6). This group is often running down assets rapidly to pay for their care. Although they, on average,

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[31] See, for example, Banks, Blundell and Tanner (1998). Dilnot *et al*. (1994) Chapter 5 looks at retirement-income expectations and outcomes.

[32] Goldschmidt-Clermont and Pagnossin-Aligisakis (1999) estimate the monetary value of production outside the System of National Accounts on the basis of data on labour inputs to these activities for 14 countries.

[33] The retired have a lower opportunity cost of time than people in work. They might therefore be able to invest more time in 'penny-pinching' (Posner, 1995), which would give the elderly a higher standard of living for a given level of observed expenditure.

[34] See, *inter alia*, Bernheim (1987), Börsch-Supan (1992), Disney (1996*a*,*b*), Hamermesh (1984), Hurd and Wise (1989*b*), Jianakpolos, Mechnik and Irvine (1989), Mirer (1980) and Shorrocks (1975).

[35] The appearance of asset accumulation in studies based on cross-section (rather than panel) data may also reflect the impact of differential mortality.

[36] The elderly could also provide incentives for their children to care for them with the prospect of inheritance, known as 'strategic' rather than 'altruistic' bequests (Bernheim, Shleifer and Summers, 1985).

make up only five per cent of the elderly in OECD countries, the effect of their exclusion is likely to distort the observed pattern of asset accumulation and decumulation.

Figure 1.1 Poverty head-counts and poverty gaps

The standard measure of poverty is a head-count: the number (or proportion) of households, families or people with incomes below the chosen threshold (relative or absolute). There are two closely related problems with this technique.

First, the choice of threshold is inevitably arbitrary and, depending on the distributions of incomes, small changes in the threshold can have large effects on the head-count. The problem is compounded in international studies by differences in income distribution. Förster (1994), for example, finds significant changes in relative low-income rates between countries with different poverty thresholds. (Although his range - from 20 to 70 per cent of median income - is rather large, particularly because incomes at the very bottom tend to be measured with substantial error).

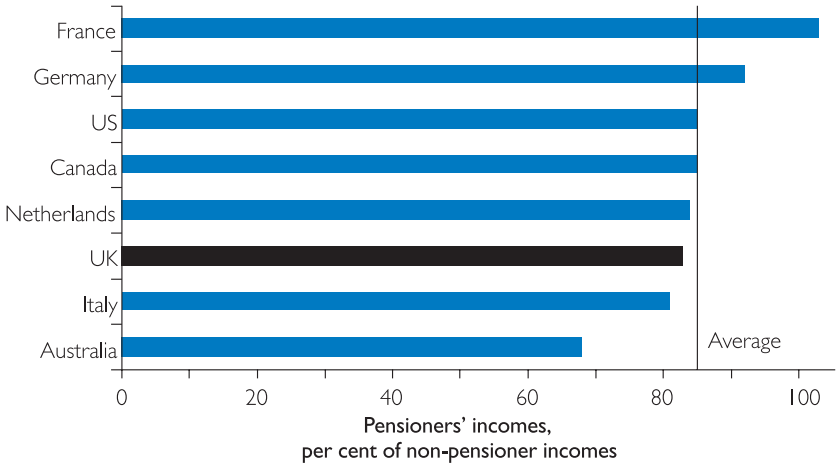
Secondly, head-counts show the incidence of poverty but say nothing about the degree to which incomes fall below the poverty threshold. This is often termed the 'intensity' of poverty. (Although some evidence can be gleaned by comparing head-counts against different thresholds.) Equal weight is given to people marginally below the poverty line and to those whose incomes fall well short. A measure that captures the intensity of poverty is the average low-income gap: the mean proportion of the poverty line by which the incomes of the poor fall below the poverty threshold. Multiplying the poverty rate by the poverty gap gives a useful result, sometimes known as the 'poverty index'. This is the proportion of aggregate household income that would be needed to bring the incomes of all the poor up to the poverty threshold (see Atkinson, 1987 for an application).

An additional extension is to look at the distribution of income among the poor. The aim is to pick up any pockets of extreme poverty. A standard measure of inequality is the Gini coefficient, which varies between zero (when all incomes are the same) and one (there is complete inequality: one person has all the income). Sen (1976, 1979) combined the three measures - poverty rate, poverty gap and inequality of low income - into a composite indicator of poverty incidence, intensity and distribution. Building on Sen's analysis, a whole class of poverty measures has been developed (known as 'P-a': see Foster, Greer and Thorbecke, 1984). The studies surveyed here report only measures based on poverty head-counts. We intend to explore these alternative measures in future work, but these more complex approaches demand greater data accuracy than simpler measures (Kakwani, 1994).

With these important issues of interpretation in mind, this chapter turns to empirical results. It focuses on how the average incomes of the old compare with the population's living standards.

Figure 2.1 compares the incomes of elderly married couples with the incomes of the rest of the population. (It is derived from Johnson, 1998: the underlying data sources are described in Appendix A.) The unit of analysis is the 'nuclear family': individual, spouse and any dependent children. Other people living in larger households are counted as separate 'income units'. Pensioners are defined as people aged 65 or over and people aged 60-64 who are not working.

Figure 2.1 Pensioner incomes as a percentage of non-pensioner incomes in eight countries, couples



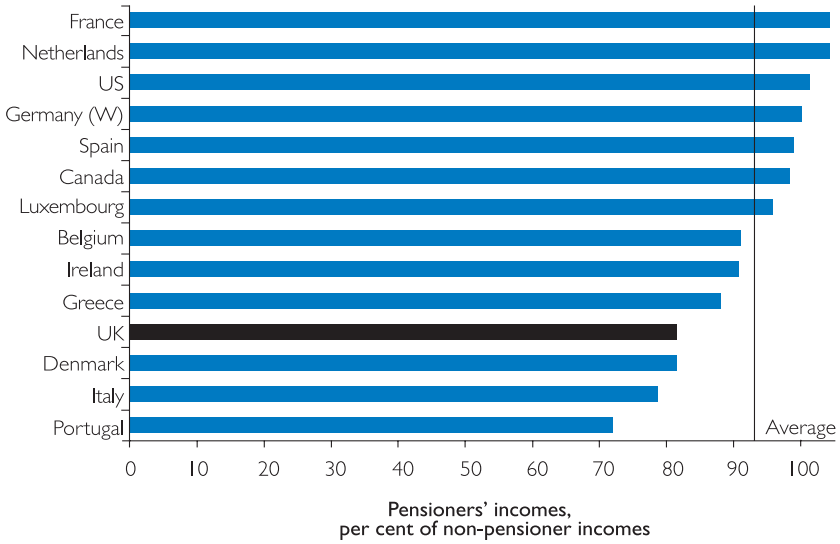
Source: Johnson (1998), Table 4.2
Note: uses an equivalence scale of 0.7 per additional adult in an income unit and 0.5 per additional child. Pensioner income units are defined as all family units headed by someone over 65 or someone aged 60-64 who is not working. The data are mainly from between 1995 and 1997, with the exceptions of Germany (1993) and the Netherlands (1993-94). See Appendix A for a detailed description of the underlying data sources.

The results are very similar for five countries, where pensioners' incomes are between 80 and 85 per cent of working-age families'. The outliers are France and Germany, with rather higher replacement rates, and Australia, with lower relative pensioner incomes. (Private pensions in Australia are predominantly paid as lump sums rather than as an annuity stream, raising some important measurement issues.) The mean replacement rate in the United Kingdom - 83 per cent - lies just below the 85-per-cent average for all eight countries.

Figure 2.2, from Hauser (1998) is based mainly on Luxembourg Income Study data, an international collection of household surveys. Again, Appendix A describes these data, which were mainly collected in the

early 1990s. The sample is very different from the other studies because it is defined by receipt of a pension rather than by age or labour-market status. The sample (presumably) excludes the elderly who receive all their income from social assistance and other government transfers (except public pensions). It will also exclude people of pension age who are in work and do not receive a public pension because of earnings tests or because they have deferred their pension.[37] Finally, the sample also covers only 65-74 year olds.

Figure 2.2 Incomes of 65-74 year olds as a percentage of population average incomes in 14 countries



Source: Hauser (1998), Table 4
Note: the data are the ratio of the average net equivalent income of people living in households headed by someone age 65-74 to the average net equivalent income of people living in households headed by people under age 55. The data are from between 1989 and 1992, with the exception of Greece (1987-88).
See Appendix A for a detailed description

Pensioners in the United Kingdom appear to fare less well compared with their counterparts overseas than they do in Johnson's study. The United Kingdom lies near the bottom of the rankings, with a replacement rate of 82 per cent compared with a mean of 92 per cent for the 14 countries.

The results of the next study, prepared for the OECD secretariat, are presented in Disney, Mira d'Ercole and Scherer (1998) and Börsch-Supan (1998). These data relate mainly from the early and mid-1990s, although the United Kingdom data are from 1988-89.[38] As in Johnson's study, the focus is on the resources of the elderly and not on the incomes of other members of their household. Here, older people living with children either are excluded from the analysis or the children's incomes are

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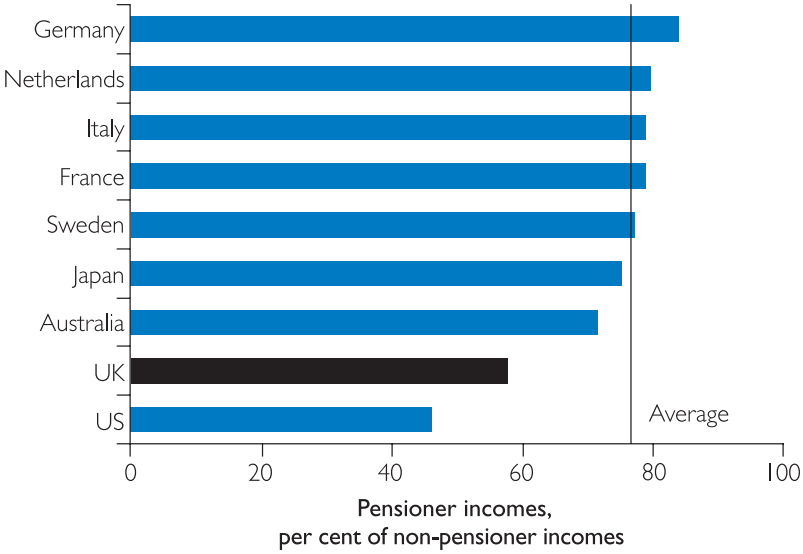
[37] See Disney and Whitehouse (1999), Sections 8.3 and 8.4, for a description of the rules regarding earnings tests and pension deferral.

[38] This is because the authors used data from the Retirement Survey, which contains more detailed information on households' assets.

ignored.[39] The study gets round the equivalence-scale problem by presenting results separately by marital status and by focusing on family-unit rather than household income.

Figure 2.3 Pensioners' incomes as a percentage of older workers' incomes in nine countries, couples



Source: Disney, Mira d'Ercole and Scherer (1998), Figure 1; Börsch-Supan (1998), Table 1
Note: compares income of households where the head is aged *circa* 67 with housholds where the head is *circa* 55. The data are from between 1992 and 1995, with the exceptions of the United Kingdom (1988-89) and the Netherlands (1990). Appendix A describes the underlying sources in detail

Figure 2.3 shows the incomes of pensioner couples (around age 67) relative to couples where the head is aged around 55. This method could reduce or increase measured replacement rates compared with the analyses above, which use a more general comparator. First, pensioners in the first few years after pensionable age tend in most countries to be richer than the whole pensioner population (see below). Secondly, middle-aged households are generally richer than the total population and the total population of working age. These two effects work in opposite directions. Thus, the overall impact is difficult to predict and will vary between countries.

Again, there is substantial bunching of different countries' replacement rates, this time between 75 and 80 per cent. The outliers are Germany, with a slightly higher replacement rate, and the United Kingdom and United States, with much lower relative pensioner incomes. These results are different from other studies, where France tended to be an outlier at the top, and the United States tended to lie nearer the middle of the

[39] Data for Germany, Japan, Sweden and the United Kingdom cover elderly family units not living with children; data for Australia and the Netherlands exclude children's resources.

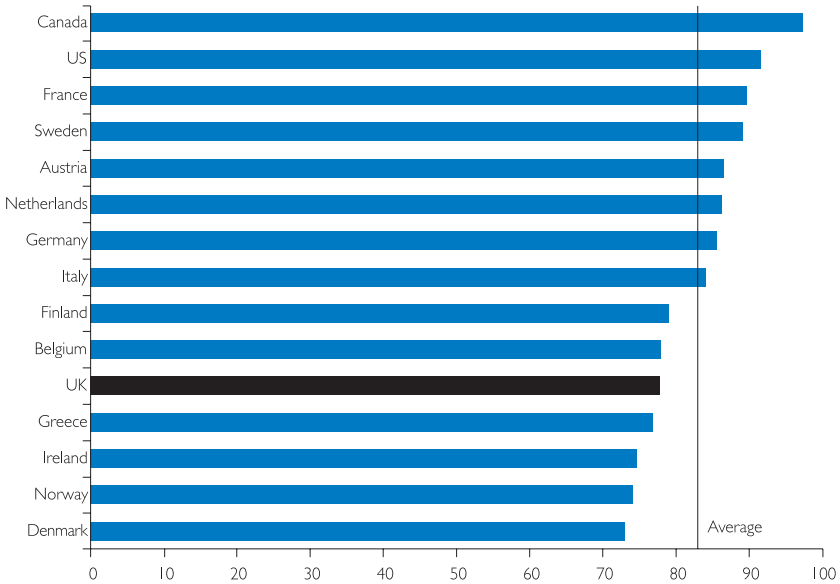
distribution. This, however, is because the data for the United States are based on gross income (before personal income tax) rather than net or disposable income (after tax). Since the personal income tax is progressive, pensioners receive additional reliefs and public pensions are partially exempted, average tax rates on pensioners are lower than tax rates on workers. This will understate the replacement rate in the United States significantly.

Again, data for Australia under-state pensioners' relative incomes because of the difficulty of measuring the returns from private pensions, which are mainly paid out as a lump-sum rather than an annuity income stream. The United Kingdom - with a replacement rate of 64 per cent, compared with a mean of 77 per cent across the nine countries - lies next to the bottom of the rankings.

Another study from the OECD secretariat - Förster and Pellizzari (2000) - also includes data on replacement rates. This study equivalises incomes by dividing them by the square root of household size. It expresses pensioner incomes as a percentage of the incomes of the population as a whole. The data are from the mid-1990s (mainly 1995 or thereabouts). The United Kingdom lies a little below the middle of the fifteen countries shown in Figure 2.4. The replacement rate of 78 per cent is below the mean of 83 per cent.

This study - since it presents detailed income data for many different age groups - also allows us to look at the impact on the results of the choice of comparator. Some papers compare pensioners with the population as a whole, some with non-pensioners and some with older workers.

Figure 2.4 Pensioners' incomes as a percentage of population incomes in 15 countries



Source: Förster and Pellizzari (2000), Table 2.3
Note: the data are from 1994 and 1995, with the exception of Italy (1993).
See Appendix A for a detailed description of the underlying data sources.

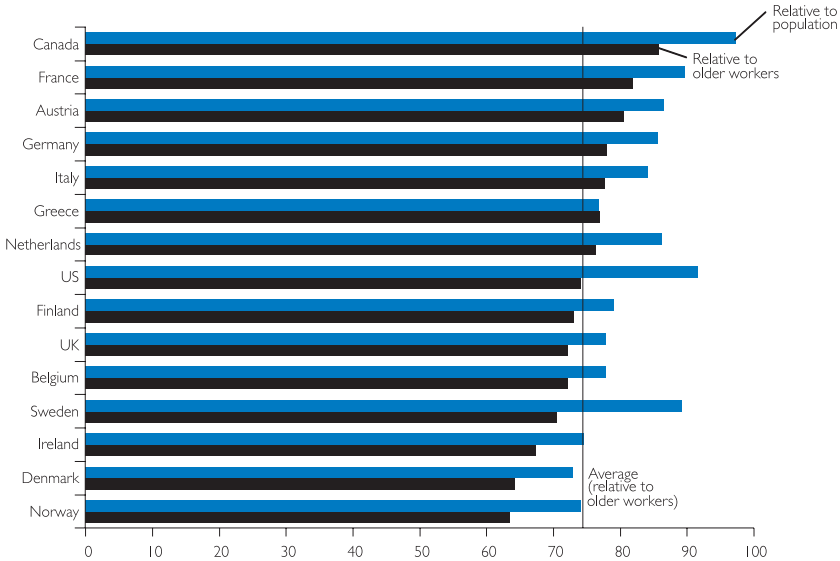
Figure 2.5 looks at the first and the last of these cases. In all cases bar Greece, the incomes of older people of working age (51-65 year olds) are higher than population incomes, by an average of 12 per cent. The difference in the United Kingdom - eight per cent - is one of the smallest (after Greece and similar to Austria). In contrast, the older working-age groups in the United States and Sweden have incomes around a quarter larger than the population as a whole.

The result of these differences is some significant re-rankings of countries. Sweden, for example, drops from fourth from the top to fourth from the bottom and the United States from second to eighth. The replacement rate in the United Kingdom of 72 per cent is rather closer to the mean (74 per cent).

Why do the incomes of older people of working age relative to the population as a whole differ so much between countries? There are two main potential explanations.

First, differences in retirement behaviour and, so, in labour-force participation rates of older working age groups. Figure 2.6 shows the different pattern of activity rates by age in a selection of OECD countries.

Figure 2.5 Pensioners' incomes as a percentage of population incomes and of older working age population incomes in 15 countries



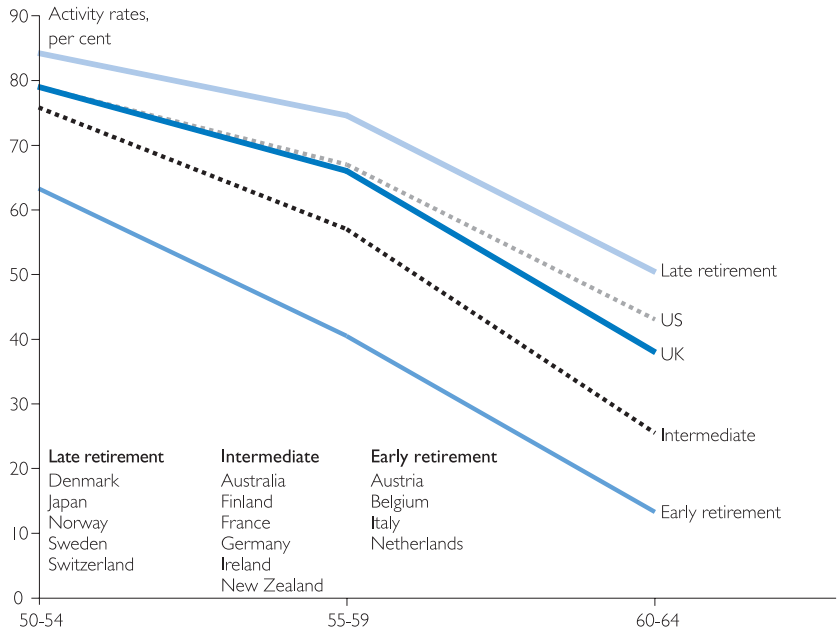
Source: Förster and Pellizzari (2000), Table 2.3
Note: older working age population defined as adults aged 51 to 65. The data are from 1994 and 1995, with the exception of Italy (1993).

We have assembled countries into three main groups. The first group, consisting of Nordic countries plus Japan and Switzerland, has relatively late retirement. In this group, half of 60-64 year olds are still economically active. At the other end of the spectrum is a group of countries with much earlier retirement. In these continental European countries, less than half of 55-59 year olds are economically active and the labour-force participation rate for 60-64 year olds is just 13 per cent.

The United Kingdom has a very similar pattern to the United States, with two-thirds of 55-59 year olds and around 40 per cent of 60-64 year olds economically active. Thus, there is no evidence that the relatively low incomes of the older working-age population in the United Kingdom can be explained by their low labour-force participation rates.

The second potential explanation for relatively low incomes of older workers in the United Kingdom is the pattern of earnings with age. The United Kingdom appears to have a particularly pronounced inverted-U shape to its age-earnings profile in cross-section data (see OECD, 1998, Table 4.4), which indicates that the oldest workers have lower pay than prime-age workers do. This explanation therefore seems more plausible than the structure of retirement behaviour.

Figure 2.6 Economic activity rates by age, 17 countries, 1995

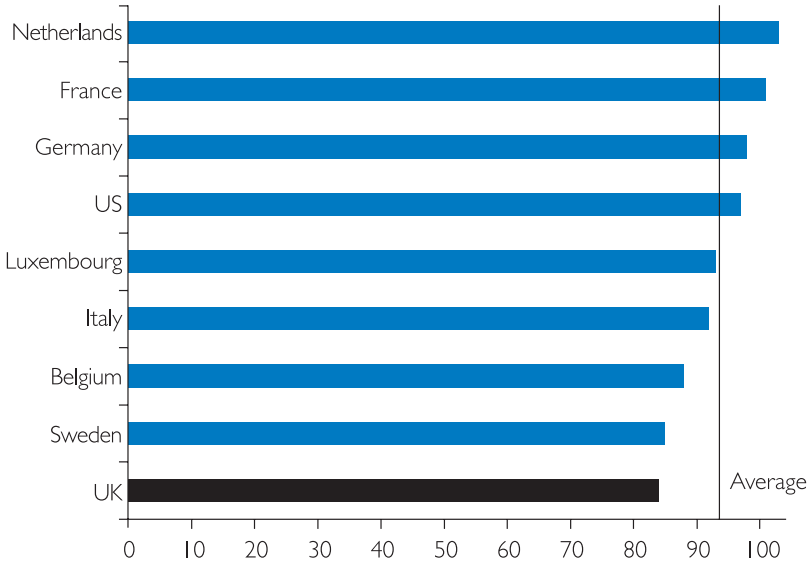


Source: ILO database

We end this section by reporting the results of the previous DSS study of pensioner incomes: Whiteford and Kennedy (1995). This study was also based on Luxembourg Income Study data, this time from the mid-1980s.

The United Kingdom ranks last in this study with a mean replacement rate of 84 per cent compared with an average of 93 per cent for the nine countries shown (Figure 2.7). The rather worse performance of the United Kingdom in this study relative to the previous ones could have many explanations. The difference with Hauser's result is perhaps the most informative, since both are based on Luxembourg Income Study data, but on different waves. This implies that the United Kingdom's replacement rate relative to other countries has improved over time.

Figure 2.7 Pensioners' incomes as a percentage of population incomes in nine countries



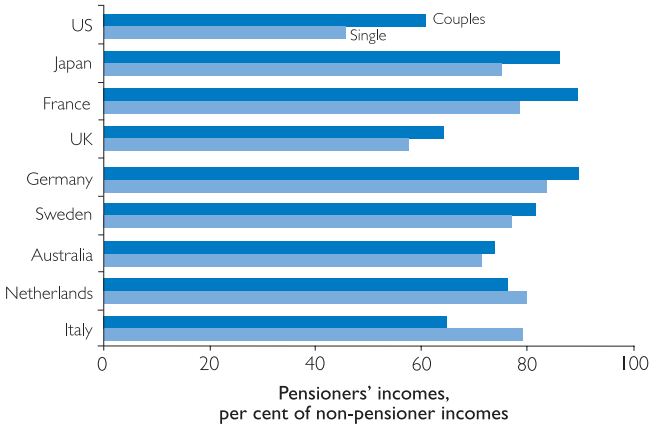
Source: Whiteford and Kennedy (1995), Table 3.5
Note: the data are from between 1984 and 1987. See Appendix A for a detailed description of the underlying sources.

2.1 The effect of sex and marital status

Many of the studies presented above divide the results between different age groups and between single and married pensioners. These differences have obvious policy implications. For example, should the pension system pay more to older than to younger pensioners? What is the appropriate level of survivors' pensions relative to the pension paid to a couple?

Figure 2.8 shows the incomes of the elderly relative to older workers for both married couples and single pensioners. (It is based on the same study as Figure 2.3.) In the seven countries at the top of the chart, couples have larger relative incomes than single pensioners do; the countries are ranked from the largest to the smallest difference. In the United States, for example, the replacement rate is 62 per cent for couples and 46 per cent for single pensioners. At the other end of the scale, single pensioners have higher replacement rates in Italy and the Netherlands. In the United Kingdom - as in most of the rest of the countries - couples are better off than single pensioners are, but the difference is not very large.

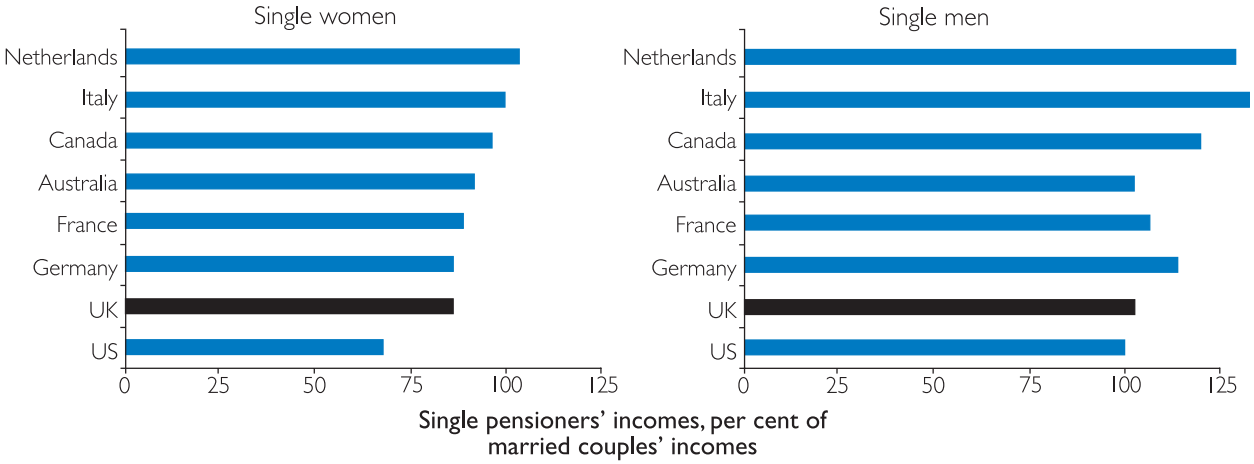
Figure 2.8 Pensioners' incomes as a percentage of older workers' incomes by marital status in nine countries



Source: Disney Mira d'Ercole and Scherer (1998), Figure 1; see also Börsch-Supan (1998), Table 1.
Note: the data are from between 1992 and 1995, with the exceptions of the United Kingdom (1988-89) and the Netherlands (1990).

Figures 2.9 and 2.10, based on Johnson (1998) and Hauser (1998) respectively, split the results by sex[40] and compare single pensioners with married couples. These studies adjust family unit incomes - dividing married couples' incomes by 1.7, for example - to compare with a single person's income. In contrast, Disney, Mira d'Ercole and Scherer (1998) - the study on which Figure 2.8 draws - look at married couples and single people directly, bypassing the 'equivalisation' problem.

Figure 2.9 Single pensioners' incomes as a percentage of married couples by sex in eight countries, equivalised

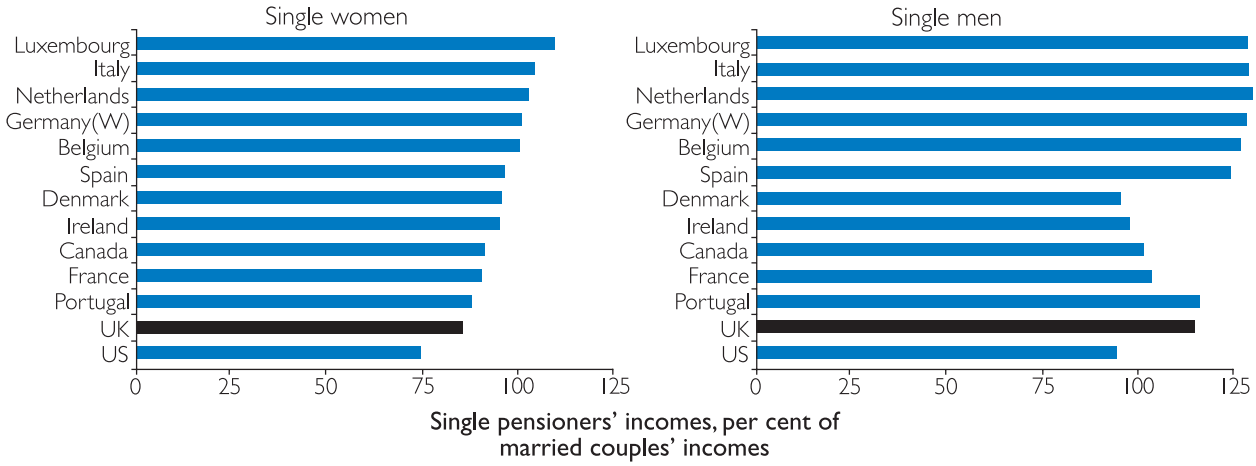


Source: Johnson (1998), Table 4.2.
Note: the data are mainly from between 1995 and 1997, with the exceptions of Germany (1993) and the Netherlands (1993-94).

[40] See also Mejer and Siermann (2000) for an analysis of gender differences in income poverty of both the elderly and the population as a whole.

Single women's incomes are generally lower than married couples' are. The exceptions in Figure 2.10, as in Figure 2.9, are Italy and the Netherlands. Figure 2.10 also reports higher incomes for single women in Germany and Luxembourg. Single men typically fare better than married couples. In Figure 2.9, the exceptions are Australia, the United Kingdom and the United States, but single men's incomes are only marginally lower (two to four per cent) than married couples'. Figure 2.10 reports much higher incomes for single men in the United Kingdom than for married couples and a similar pattern in Denmark and Ireland.

Figure 2.10 Single pensioners' incomes as a percentage of married couples by sex in 13 countries, equivalised



Source: Hauser (1998), Table 5
Note: the data are from between 1989 and 1992

2.2 The effect of age

The most convincing explanation for these patterns is the difference in structure of pension benefits. Most of the continental European systems pay the same absolute amount of pension benefits to a single man and a married man with the same employment and earnings record. One consequence is that the equivalised incomes for married couples where one partner has an incomplete contribution history are lower than for single pensioners. But the flat-rate systems of Denmark, Ireland and the United Kingdom (and the means-tested system in Australia) pay a higher benefit to married couples where one partner (usually the wife in the case of these cohorts) has accumulated little or no pension rights of her own. This means that replacement rates for single pensioners are much closer to those of married couples than in other countries. Johnson (1998) posits another explanation for the relatively low incomes of single women. Many single female pensioners, especially those with few pension rights of their own, live with others. Since the means tests for social-assistance benefits depend on household incomes, these single women can have little if any entitlement to public transfers. They therefore often have little income of their own.

Figure 2.11 shows that pensioner incomes tend to decline with age, with the exceptions of Canada and Australia. In most cases - particularly in the pension systems of continental Europe, with comprehensive earnings replacement - the decline results from a cohort effect. When people reach pension age, their benefit is determined by their past earnings, which will be higher for younger cohorts. Most schemes now index pensions in payment to prices rather than wages.[41] Since wages tend to rise faster than prices, this implies that new retirees will have larger pension entitlements than existing pensioners.

In other cases, the decline in incomes with age reflects the immaturity of the system. The United Kingdom is one example. The second-tier State Earnings-Related Pension Scheme (SERPS) was only introduced in 1978. Benefits for successive cohorts of retirees are increasing rapidly, and peaked only in 1998. Only in another twenty years or more will all pensioners have full, mature SERPS benefits for any periods they spent contracted in to SERPS. Thus, recently retired pensioners had an average SERPS benefit of over £20 in 2000, compared with £3.30 for pensioners as a whole.[42] There has been a similar effect with occupational pensions. A series of measures in the 1970s and 1980s improved the protection of the pension rights of 'early leavers'.[43] The Department of Social Security's Pensioners' Incomes Series, for example, shows an increase in real mean occupational pension receipt of 162 per cent between 1979 and 1996-97 as successive cohorts of retirees received higher pensions.

Australia has the reverse pattern to other countries: older pensioners are richer than younger ones. This probably stems from the complex behavioural effects of the means-tested system coupled with private pension benefits mainly paid as lump sums.[44]

The effects are broadly similar for single pensioners of both sexes. These effects must be interpreted with caution, because younger single pensioners are more likely to be never-married while older single pensioners are typically widows (and, more rarely, widowers). The age-profile of income in Canada is downward sloping for single pensioners, closer to the pattern observed in other countries. In France in contrast, the profile is upward sloping for single men. Finally, in Italy and the Netherlands, single men's incomes decline much more rapidly with age than married couples' do.

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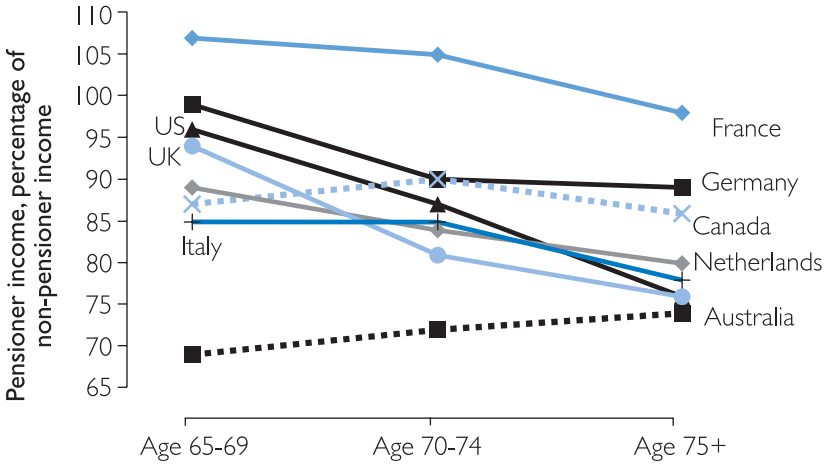
[41] Germany indexes benefits to net wages, which, since contribution rates are increasing because of the pressures of ageing, results in a slower increase in benefits than indexation to gross wages.

[42] Department of Social Security (2000*g*), page 15 and Table RP6.

[43] See Whitehouse (1998), section III for a description.

[44] See Creedy and Disney (1989, 1990).

Figure 2.11 Pensioner incomes as a percentage of non-pensioner incomes by age in eight countries, couples



Source: Johnson (1998), Table 4.2
Note: the data are mainly from between 1995 and 1997, with the exceptions of Germany (1993) and the Netherlands (1993-94)

What explains the pattern of declining pensioner income with age? First, most public pension systems now increase benefits automatically with changes in the cost or standard of living. However, older pensioners can have lower incomes because of incomplete indexation in the past. Private pension benefits and annuity incomes are often unindexed or only partially indexed. Secondly, successive generations are richer because of economic growth, known as a cohort effect. With higher lifetime incomes, we might expect each generation of pensioners to be richer than its predecessors were. Thirdly, women live longer than men do and women pensioners tend to be poorer (Figure 6.4 discusses this problem further).

Fourthly, some of the decline in incomes with age reflects the role of earnings among younger pensioners. According to the Department of Social Security's Pensioners' Incomes Series, recently retired pensioner couples (where the man is aged 65-69) have gross incomes £100 a week more than couples where the head of household is over 75. Around half of this difference - a little over £50 a week - is because of the higher average earnings of the recently retired pensioners. For single pensioners, the effect is still more pronounced. Earnings make up nearly 60 per cent of the difference in incomes between recently retired pensioners and the over 75s. They account for nearly £30 a week of the total difference of around £50 a week. This is predominantly an age rather than a cohort effect. Nevertheless, only a small minority has income from earnings. Among the recently retired, 23 per cent of couples and 16 per cent of single pensioners had some income from earnings. These proportions are 15 per cent and 4 per cent respectively for couples and single pensioners of all ages. The pattern of average incomes by age is therefore distorted by a small number of relatively well off younger elderly who are still working.

The apparent decline in incomes of older pensioners therefore results from a series of complex effects and it is important, as we will argue in the following Chapter, to look beyond simple income averages. Following pensioner incomes across time allows some of the cohort (date-of-birth) effect to be disentangled from the age effect. Johnson and Stears (1996) find that cohort effects explain the decline in income with age in the United Kingdom. Under-indexation of pension benefits and decumulation of assets (which are predominantly age effects) explain only a small part of the pattern. The average income of each cohort in fact increases over time. Only some of this pattern can be explained by features of the pension system: the rest can only be a result of differential mortality. This results in a compositional problem: the relatively rich will be over-represented among the oldest pensioners because they tend to live longer.

2.3 Absolute living standards

The analyses above were all based on relative measures of living standards: the elderly in a particular country were compared with the population as a whole in the same country. However, this approach does not provide for direct comparisons of absolute living standards. How do pensioner incomes overseas compare with overall living standards and those of pensioners in the United Kingdom?

Such an analysis is complicated because exchange rates are very volatile. Purchasing-power-parity exchange rates attempt to correct for this by showing the exchange rate that would equalise the cost of a particular basket of goods in a particular currency. The results in Table 2.1 use the OECD's purchasing power parities for 1985, with different years' results deflated to 1985 prices in the relevant national currency. A second problem is that this analysis relies on a greater degree of comparability between different countries' data sources than does a study of pensioner living standards relative to general incomes in the same country.

The results in Table 2.1 are shown as percentages of the population equivalent mean income in the United Kingdom. Countries are ranked by their population mean income relative to the United Kingdom. The Netherlands, at the top, has an average population income of 83 per cent of the United Kingdom level. Citizens of the United States are 49 per cent richer than those of the United Kingdom are.

The results show some rather different patterns to the replacement rate data presented above. Pensioners in Italy, the Netherlands and Sweden have broadly similar incomes to British pensioners. However, Canada and the United States, which often had replacement rates among the lowest, have the most prosperous pensioners in absolute terms. Despite the broader income distribution in North America compared with most European countries, Canada's lowest-income pensioners (the bottom decile) are the best off and America's have a similar absolute living standard to the poorest pensioners in the United Kingdom. French pensioners

are also substantially better off than their British counterparts. This is explained in part by the fact that overall incomes are more than ten per cent higher and in part, by the better relative position of pensioners. Interestingly, the United Kingdom has (along with the Netherlands and Sweden) among the most equal distribution of pensioner incomes. The central 80 per cent of pensioners in the United Kingdom lie between 51 and 131 per cent of the population mean.

Purchasing power parities are a macroeconomic concept: they adjust GDP to reflect differences in purchasing power. It is simple, of course, to derive a microeconomic concept from this macroeconomic idea. This microeconomic measure is, however, GDP *per capita*. In contrast, the studies of income distribution here use a different equivalence scale (not *per-capita* income). Household size and composition vary between countries, so the appropriate adjustment is not the GDP-based purchasing power parity.

Table 2.1 Incomes of elderly and population adjusted by purchasing power parity exchange rates as a percentage of population mean income in the United Kingdom, ten countries

	Elderly				Population		
	Median	Mean	Bottom decile	Top decile	Median	Mean	Bottom decile
Netherlands	72	86	57	136	71	83	43
Italy	73	82	41	133	78	90	38
Sweden	76	82	54	117	95	97	55
United Kingdom	72	84	51	131	88	100	47
Australia	60	78	48	133	93	105	46
Germany	90	104	52	159	95	106	55
France	92	112	61	184	96	111	51
Luxembourg	103	114	57	184	111	123	68
Canada	102	122	68	205	124	137	61
United States	119	145	52	270	131	149	48

Source: Whiteford and Kennedy (1995), Table 3.19

Note: the data are from between 1984 and 1987

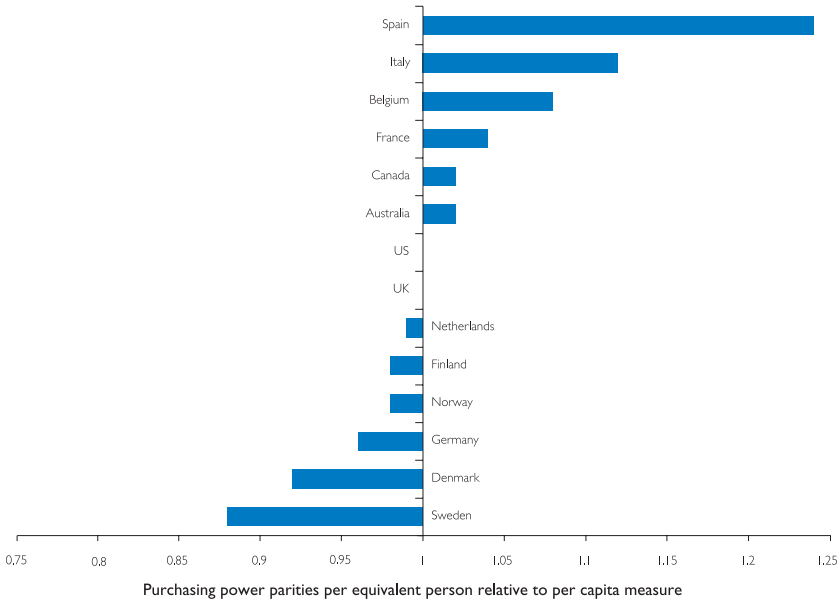
Using micro datasets, it is possible to adjust OECD purchasing power parities to take account of these differences. Rainwater and Smeeding (1999) estimate from Luxembourg Income Study data the ratio of mean income per equivalent person to mean income *per capita*. Figure 2.12 shows the results. In the United Kingdom, equivalent income per person is 2.15 times the mean income per person. In Spain, families are larger on average and there are fewer older people living alone. This means that Spanish living standards are some 24 per cent higher once we allow for different family structure than they are on a *per-capita* basis. At the other end of the scale, family sizes are smaller in the Nordic countries that they are in the United Kingdom. In Sweden, for example, adjusting

for different household size implies living standards are 12 per cent lower than they are when measured with unadjusted purchasing power parities.

The effect of these adjustments on the results in Table 2.1 would be large. For example, pensioners in Britain would move well ahead of Sweden and draw level with the Netherlands. However, Italian pensioners would move from a living standard a little below those in the United Kingdom to a level around 10 per cent ahead.

This simple analysis of potential adjustments to purchasing power parities suggests that comparisons of absolute living standards should be treated with caution.[45]

Figure 2.12 Equivalised purchasing power parities relative to purchasing power parities on a per capita basis, 14 countries



Source: Rainwater and Smeeding (1999), p. 143

2.4 Summary and comparison of findings

This chapter has reported the results of several papers on 'replacement rates': average pensioners' incomes relative to general living standards. This section assesses the robustness of the findings of these cross-country studies and draws some preliminary conclusions. Any analysis is complicated by the different country coverage of the studies and the disaggregation of the results in varying ways.

We compare the results of different studies pair-wise in a series of matrices. The first line in each cell of the following tables shows the correlation coefficient between the replacement rates reported for each overlapping

[45] There are many other potential adjustments: for example, to use the median rather than the mean person. The more unequal a country's overall income distribution, the less accurate the mean as a guide to the living standards of the 'typical' person. See Rainwater and Smeeding (1999) and Brungger (1996).

country in the relevant two studies. The significance level, from a standard test, is reported in parentheses. (This tests the null hypothesis that the two datasets are statistically related: thus, an entry at this point below 0.05 implies that the results from the two studies considered are statistically indistinguishable.) The second line in each cell reports the mean respective replacement rate in the two studies that are compared. The third line reports the number of countries that the two relevant studies have in common. (Note that the means reported in each case are calculated only for the countries that the two relevant studies have in common.) The final line shows the results for the United Kingdom.

We have included an extra study in this test of robustness of different studies - that of Burniaux et al. (1999) - which was excluded from the earlier analysis because it does not cover the United Kingdom. However, we feel that this offers a useful comparative benchmark for assessing the other studies (that include the United Kingdom).

Table 2.2 compares the three studies that report a replacement rate for the entire pensioner population. The two OECD-based studies - Burniaux and Förster[46] - report essentially the same results. The correlation coefficient is 0.98 and the means are very similar for the nine countries that are covered by both studies. Neither, however, bears much relationship to the earlier Whiteford study. On the United Kingdom specifically, the Whiteford study ranks the country lowest out of nine countries in replacement-rate terms, while Förster ranks the United Kingdom tenth out of 14 (see Table 2.7 below).

Table 2.2 Comparison matrix for replacement rates: all pensioners, three studies

	Förster	**Whiteford**
Burniaux	Correlation: 0.98 (0.00) Means: 85,84 Observations: 9 UK: n/a, 78	Correlation: 0.31 (0.34) Means: 89,96 Observations: 6 UK: n/a, 84
Förster		Correlation: 0.56 (0.15) Means: 85,94 Observations: 8 UK: 78,84

The next two tables compare studies that present replacement rates divided by marital status. These studies give different results. Correlation coefficients are generally low and always insignificant. Means are wildly different, as are the numerical results for the United Kingdom. However,

[46] Here and in the following tables, studies are referred to by the name of their leading author alone. Apologies to 'subsequent' authors.

the United Kingdom consistently ranks towards the bottom of the replacement rate table for both marital-status groups.

Table 2.3 Comparison matrix for replacement rates: pensioner couples, three studies

	Johnson	Whiteford
Disney	Correlation: 0.59 (0.17) Means: 74,85 Observations: 7 UK: 64,83	Correlation: 0.20 (0.67) Means: 76,96 Observations: 7 UK: 54,83
Johnson		Correlation: 0.43 (0.40) Means: 88,97 Observations: 6 UK: 83,84

Table 2.4 Comparison matrix for replacement rates: single pensioners, two studies

	Whiteford
Disney	Correlation: 0.51 (0.24) Means: 71,91 Observations: 7 UK: 58,85

The following tables compare the studies that divide replacement rates by age group. There is a further split because Hauser reports results using 'old-' and 'new-OECD' scales (using his terminology). Sticking with the comparison between equivalence scales, the results are highly correlated between countries: the choice between these two scales does not affect the average living standards of pensioners relative to the population. It does, however, significantly affect the mean replacement rate. This is an important result that deserves to be explored further.

Comparing Hauser's with other results presented on a similar basis reveals some closer correlations than exhibited previously, although only for younger pensioners.

Table 2.5 Comparison matrix for replacement rates: age 65-74, four studies

	Hauser (old scale)	Hauser (new scale)	Whiteford
Förster	Correlation: 0.76 (0.01) Means: 87,92 Observations: 11 UK: 80,82	Correlation: 0.80 (0.01) Means: 88,86 Observations: 10 UK: 80,76	Correlation: 0.78 (0.01) Means: 89,94 Observations: 10 UK: 80,85
Hauser (old scale)		Correlation: 0.99 (0.00) Means: 93,86 Observations: 12 UK: 82,76	Correlation: 0.78 (0.01) Means: 95,96 Observations: 9 UK: 82,85
Hauser (new scale)			Correlation: 0.79 (0.01) Means: 88,97 Observations: 9 UK: 76,85

Table 2.6 Comparison matrix for replacement rates: age 75 plus, five studies

	Hauser (old scale)	Hauser (new scale)	Johnson	Whiteford
Förster	Correlation: 0.53 (0.10) Means: 71,98 Observations: 11 UK: 74,71	Correlation: 0.55 (0.09) Means: 78,77 Observations: 10 UK: 74,65	Correlation: 0.24 (0.60) Means: 82,82 Observations: 7 UK: 74,75	Correlation: 0.13 (0.74) Means: 80,86 Observations: 9 UK: 74,80
Hauser (old scale)		Correlation: 0.99 (0.00) Means: 87,78 Observations: 12 UK: 71,65	Correlation: 0.40 (0.45) Means: 87,82 Observations: 7 UK: 71,75	Correlation: 0.41 (0.35) Means: 88,89 Observations: 9 UK: 71,80
Hauser (new scale)			Correlation: 0.35 (0.38) Means: 79,82 Observations: 7 UK: 65,75	Correlation: 0.35 (0.26) Means: 79,89 Observations: 9 UK: 65,80
Johnson				Correlation: 0.74 (0.04) Means: 81,87 Observations: 8 UK: 75,80

Unfortunately, the overlap of the different studies that we have surveyed is limited both because different countries are covered and because results are presented in different ways. The pair-wise comparisons in this section have shown that it is very difficult to draw robust conclusions about the relative position of British pensioners compared with their counterparts overseas. We end the chapter by showing the United Kingdom's position in the league table of pensioner replacement rates in different studies (Table 2.7). Unfortunately, different disaggregations in different studies (and the absence of data on the weights of different sex, marital status and age groups) prevent us from completing all cells in the Table.

The United Kingdom is mainly towards the bottom. The ranking in each study should be used with caution because there is often substantial clustering of countries around similar replacement rates. Given the high degree of measurement error in such studies, the exact position in the league table cannot be seen as accurate.

Table 2.7 United Kingdom ranking in five studies of pensioner replacement rates

	All	Couples	Single	65-74	75-
Disney		8/9	8/9		
Förster	11/15			11/16	10/15
Hauser				11/14, 10/12	12/14, 11/12
Johnson		6/8	6/8	4/8,7/8	6/8
Whiteford	9/9	9/9	8/9	10/11	9/11

Note: the two lines for Hauser refer to the 'old-' and 'new-OECD' equivalence scales respectively. Since the replacement rates for countries are often closely clustered, the exact rankings should be interpreted with caution.

3 THE POSITION OF PENSIONER INCOMES IN THE POPULATION INCOME DISTRIBUTION

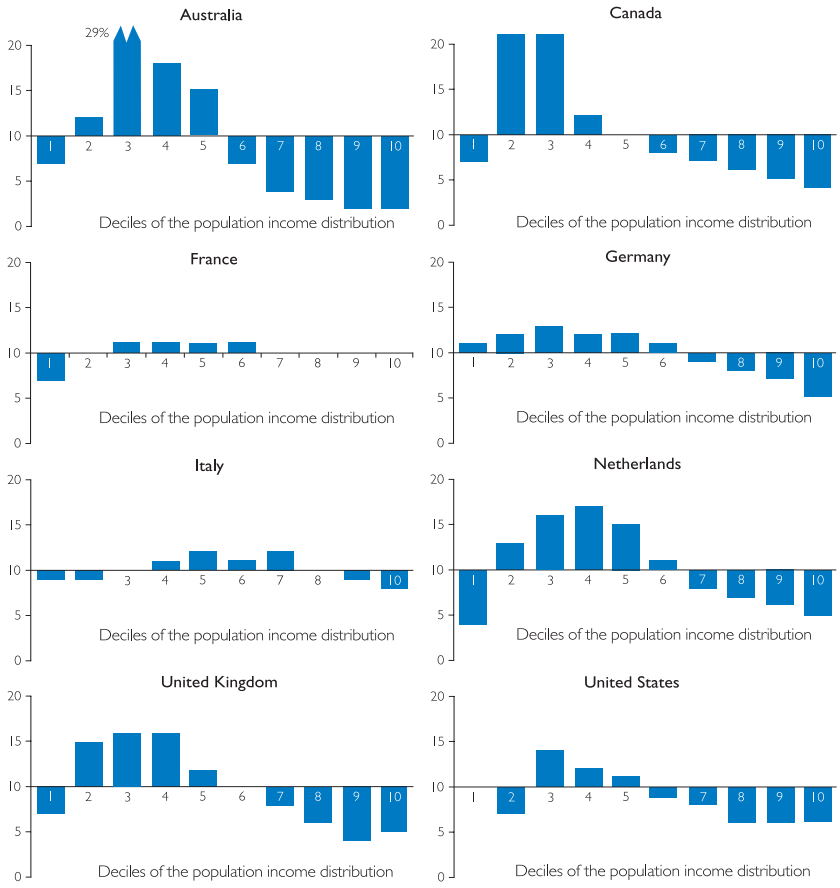
'Beware of the mean', warns Quinn (1987), in the title of his study of the economic status of the elderly in the United States. Chapter 2 looked only at pensioners' average incomes. However, that analysis disguises a large degree of dispersion between different pensioners' economic circumstances in a single country. This distinction is extremely important from a public policy perspective. A small number of pensioners with a very high income - by way of illustration - will generate a high mean pensioner income, but this may disguise a large number of pensioners with very modest means. This chapter is wary of the mean: it looks at the position of pensioners in the income distribution as a whole.

Figure 3.1 shows the position of pensioners in the population income distribution (drawn from Johnson, 1998). The population has been divided into tenths (or deciles), from the poorest tenth to the richest. If pensioners' incomes were to match the pattern of the population, then a tenth of pensioners would obviously be in each of the population deciles. Hence, Figure 3.1 draws the scale through the ten-per-cent level. Bars above the line mean that pensioners are over-represented in that income decile; and bars below the line, that they are under-represented.

The patterns are remarkably similar between many countries. Pensioners tend to be under-represented in the bottom one or two deciles; that is, the poorest groups in society. Typically, pensioners are then over-represented in the following few deciles, up to the fourth, fifth or six. Finally, there are generally disproportionately few pensioners in the highest income deciles.

As might be expected, the profile is much flatter in countries with comprehensive old-age social insurance programmes, such as France, Germany and Italy. A much greater concentration of pensioners in the low-to-mid deciles is observed in Australia, which has a means-tested public pension system. There is a similar pattern in Canada, the Netherlands and the United Kingdom - with predominantly flat-rate public schemes - and in the United States, where the public pension plan has a highly progressive formula. Each of these systems pays either only a little more, no more or less to pensioners who had higher earnings during their working lives. The result is generally a lower proportion of pensioners at the very bottom of the income distribution, but rather fewer with incomes in the top half of the population distribution.

Figure 3.1 Percentage of pensioners in each decile of the population income distribution in eight countries, equivalised



Source: Johnson (1998), Table A1
Note: Decile 1 is the poorest tenth of the overall income distribution, decile 10 the group with the highest income. The data are mainly from between 1995 and 1997, with the exceptions of Germany (1993) and the Netherlands (1993-94)

We noted in Chapter 1 that these studies ignore the extra costs of disability faced by some groups. This is, of course, likely to be an important issue for the elderly, where morbidity rates are much higher than for the working-age population. The extra costs of disability are recognised in the benefit system of the United Kingdom. Recipients of disability benefits are much less likely to be in the lowest quintile of the population income distribution (13 per cent) than pensioners as a whole (27 per cent), because of their extra benefit entitlement.[47] Nevertheless, it is not possible to adjust incomes for the extra cost of disability, and so there is a danger in overstating the incomes of the disabled.

We have deepened our analysis of pensioner incomes in this chapter by looking at their distribution of income compared with the population as a whole. The distribution in the United Kingdom is very similar to other Anglo-Saxon countries - Australia, Canada and the United States - and the Netherlands and, to a slightly lesser extent, Germany.

[47] Department of Social Security (2000*d*), Table 7.5.

4 MEASURES OF INCOME POVERTY

This chapter focuses on the poorest groups rather than the income distribution as a whole. The first part looks at pensioner poverty rates: the proportion of the elderly with incomes below a specific poverty threshold. As discussed in the chapter on measurement issues, the poverty lines are relative. Some studies define poverty as having an income in the bottom quintile of the population income distribution, others relative to some proportion of the population mean or median income. The second part of this chapter reports poverty shares: the proportion of people below the poverty threshold that is elderly.

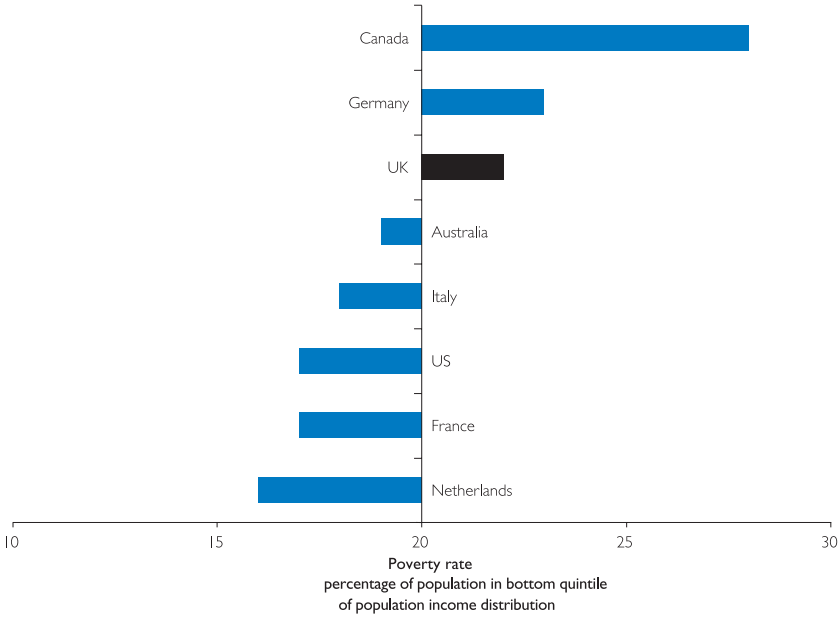
These measures are complementary. The second sheds light mainly on the inter-generational distribution of income: what priority should be placed on policies to attack poverty among the elderly relative to poverty of other groups, such as families with children? The first informs both inter- and intra-generational questions: does the pension system protect the elderly poor and is the distribution of pension benefits 'equitable' or 'fair'?

Note that we use the term 'poverty' as shorthand for groups on low incomes, although we acknowledge that in reality poverty encompasses many more dimensions of deprivation and social exclusion, as discussed in Chapter 1.

4.1 Income poverty rates

The analysis of low incomes begins with a study that measures poverty of the elderly as the proportion of pensioners with incomes in the bottom quintile of the population income distribution. Figure 4.1, from Johnson (1998), summarises the more complete data from Figure 3.1. The intercept of the chart is now drawn at 20 per cent: so bars to the right imply the elderly are over-represented among the poor and to the left, that the elderly are under-represented. In most countries, the proportion of the elderly in the bottom quintile of incomes is close to the 'neutral' level of 20 per cent. Canada shows the highest degree of over-representation. In five countries, however, fewer than one in five pensioners are in the bottom quintile. The United Kingdom - with a score of 22 per cent - lies just above the mean for the eight countries in the study.

Figure 4.1 Pensioner income poverty rates in eight countries:percentage of elderly in the bottom quintile of the population income distribution



Source: Johnson (1998), Table A1
Note: the data are mainly from between 1995 and 1997, with the exceptions of Germany (1993) and the Netherlands (1993-94)

The other international studies surveyed here have used alternative thresholds for poverty to the bottom quintile of the population income distribution.[48] Figure 4.2 is based on a definition of poverty as having an income below half of the population mean income. This measure is more robust with respect to changes in the shape of the overall income distribution than the bottom-quintile measure. For example, a higher proportion in the bottom quintile of a more equal income distribution might generate higher measured poverty. However, this might mean that pensioners are relatively better off than their counterparts in a country with a more dispersed distribution of income. Unfortunately, however, this measure has no simple comparator, whereas whether the proportion of pensioners in the bottom quintile exceeds 20 per cent or not gives a quick indication of whether the elderly are over- or under-represented among the poor. In addition, measuring incomes relative to the mean leaves the results vulnerable to the effect of outliers and measurement error.

Figure 4.2 shows that the United Kingdom has the second highest pension poverty rate with nearly a quarter of pensioners found to have incomes below half the average.

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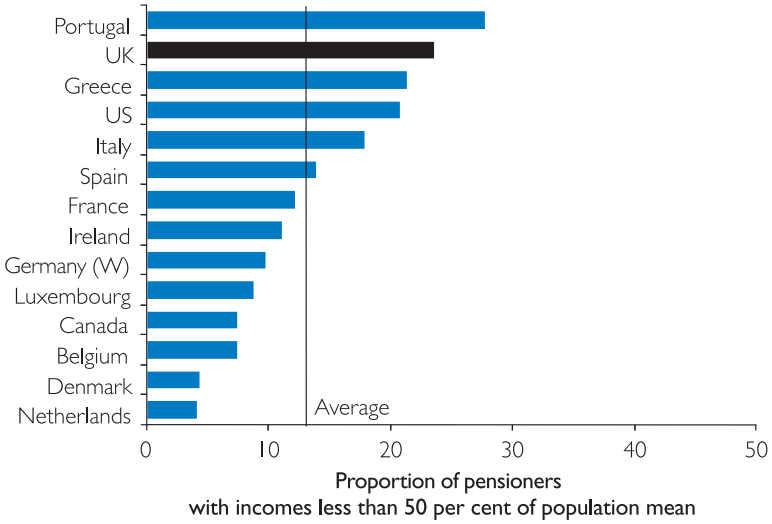
[48] Burniaux *et al.* (1998) also count people as poor if they lie in the bottom quintile of the overall income distribution but their results do not cover the United Kingdom and so are excluded from our detailed analysis here.

Figure 4.2 Pensioner income poverty rates in 14 countries: percentage of pensioners with incomes below half population mean

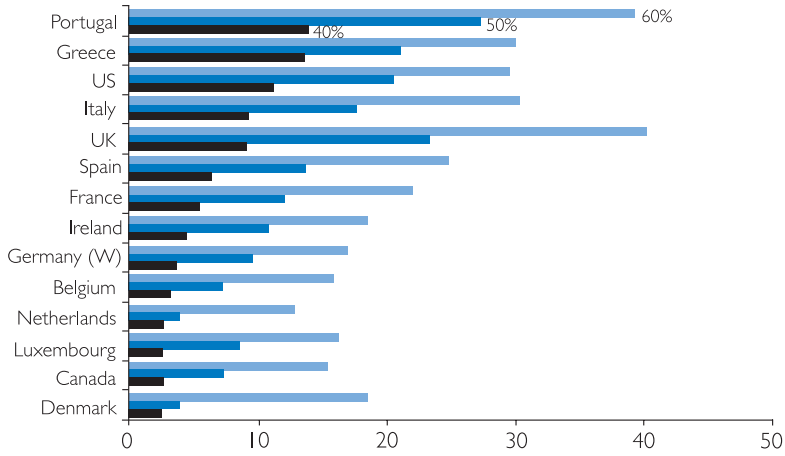


Source: Hauser (1998), Table 6
Note: the data are from between 1989 and 1992, with the exception of Greece (1987-88)

Figure 4.3 extends the analysis of this study by using three different poverty thresholds: incomes of 40, 50 and 60 per cent of the population mean. Naturally, a higher threshold increases measured poverty. An average of six per cent of pensioners have incomes under 40 per cent of the population mean, 13 per cent are under the 50-per-cent threshold and 24 per cent count as poor with a 60-per-cent poverty line.

There are some significant re-rankings in countries' relative poverty rates (under the chosen definition of poverty) with the different poverty lines. In the United Kingdom, nine per cent of pensioners have incomes below 40 per cent of average, the fifth highest proportion. However, with a 60-per-cent threshold, the United Kingdom has the highest measured elderly poverty rate (at 40 per cent). Similarly, Denmark has the second lowest poverty rate with the lowest threshold but moves up six places with the higher poverty line.

Figure 4.3 Pensioner income poverty rates in 14 countries: proportion of pensioners with incomes below specified proportions of population mean



Source: Hauser (1998), Table 7
Note: the data are from between 1989 and 1992, with the exception of Greece (1987-88)

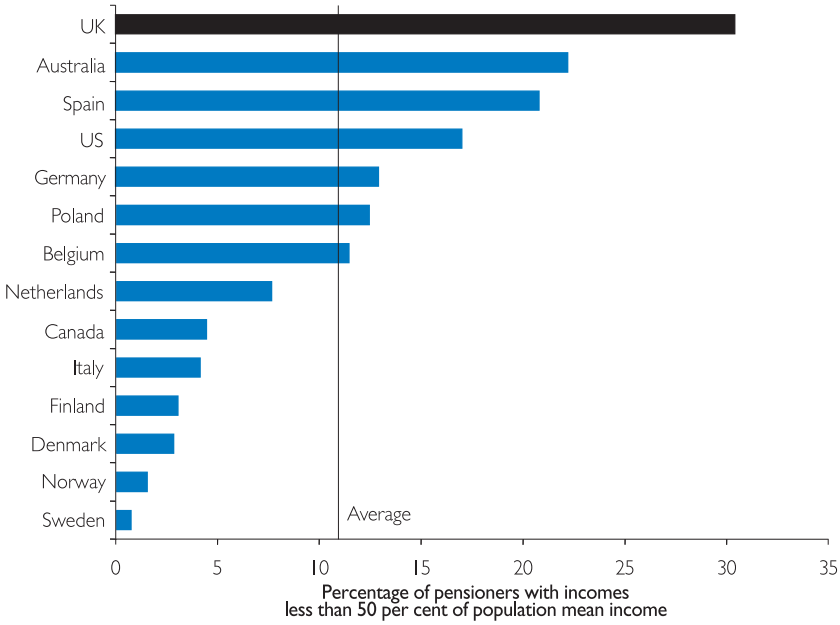
Other countries have very similar positions whichever the choice of threshold. Moreover, the results with different poverty lines are strongly related, as the following correlation matrix shows:

	40%	50%	60%
40%	1	—	—
50%	0.95	1	—
60%	0.88	0.95	1

The next three studies are also based on Luxembourg Income Study data. Figure 4.4 draws on Bradshaw and Chen (1996). It shows the percentage of elderly households with incomes below half of the population mean income. The United Kingdom has a much higher pensioner poverty rate than most other countries in this paper. We suspect that the main reason for this result is the exclusion of housing benefit from the measure of income.[49] We return to the issue of differing policies on subsidised housing below in the section on in-kind incomes. However, it is worth noting here that this treatment is unique to the Bradshaw-Chen study. All other papers surveyed here define income as all cash income and 'near-cash' income, where the latter specifically includes, for example, housing benefit in the United Kingdom and food stamps in the United States. Given the importance of housing benefits to poorer pensioners in the United Kingdom - some 17 per cent of all pensioners receive the benefit - it is unsurprising that this treatment has a significant effect on measured poverty rates.

[49] The authors are not transparent, but they state: 'Excluded from consideration here are the impacts of housing benefits and subsidies…' (p. 4).

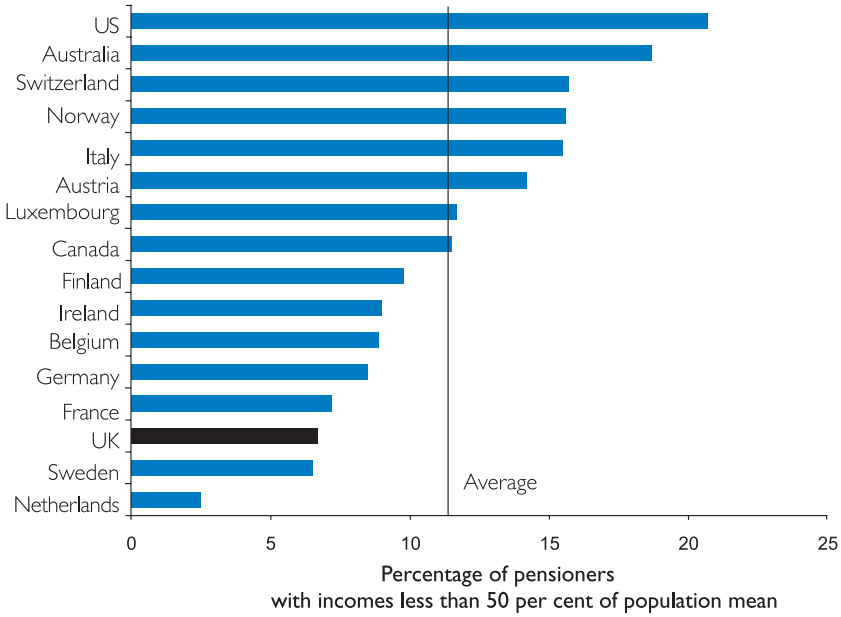
Figure 4.4 Pensioner income poverty rates in 13 countries: percentage of pensioner couples with incomes below half population mean



Source: Bradshaw and Chen (1996), Table 3
Note: the data are from between 1989 and 1992

Figure 4.5 shows the pensioner poverty rate from Atkinson, Rainwater and Smeeding (1995). Again, poverty is defined as an income below half of the population average. Here, in stark contrast to the previous study, the United Kingdom lies very close to the bottom of the scale. The pensioner poverty rate is under seven per cent, compared with an average of over 11 per cent for the 16 countries analysed. (Poverty rates relative to a higher threshold - 70 per cent of average income - are shown in Appendix B.)

Figure 4.5 Pensioner income poverty rates in 16 countries: percentage of pensioner couples with incomes below half population mean



Source: Atkinson, Rainwater and Smeeding (1995), Table 7.2
Note: the data are from between 1984 and 1987, with the exceptions of Belgium (1988), Finland (1990) and Switzerland (1982)

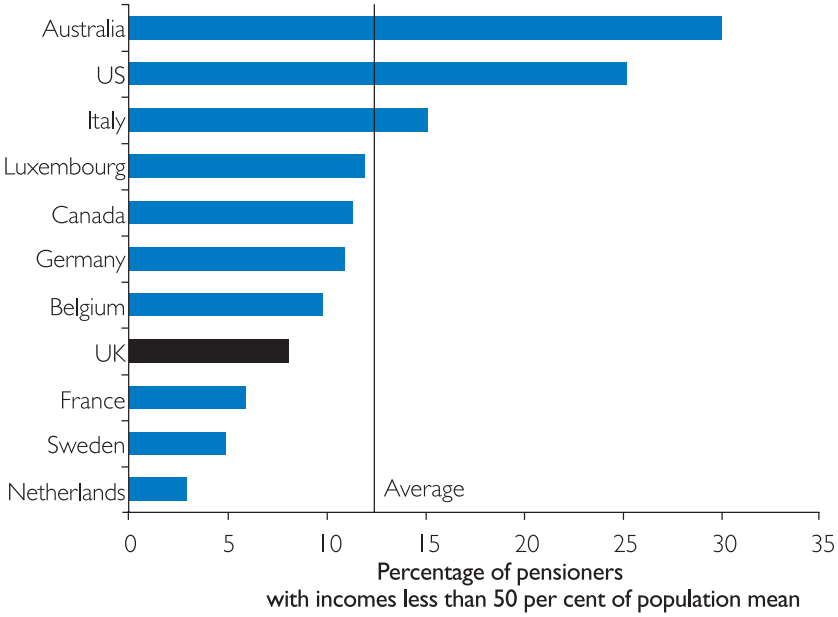
These results are similar to the earlier report for the Department of Social Security that was also based on Luxembourg Income Study data: Whiteford and Kennedy (1995). Figure 4.6 shows the pensioner poverty rate in the 11 countries covered by this study.

Whiteford and Kennedy, like Hauser, also use a higher and a lower poverty threshold (of 40 and 60 per cent of average income respectively). The correlation matrix between the poverty rates relative to these different thresholds again suggests that the choice of cut-off income is generally not important, although the different results are not as close as in Hauser's study:

	40%	**50%**	**60%**
40%	1	—	—
50%	0.76	1	—
60%	0.51	0.91	1

As in Hauser's study, the United Kingdom has lower poverty rates relative to lower than to higher thresholds. The United Kingdom has the third and fourth lowest pensioner poverty rate with a cut-off of 40 and 50 per cent respectively. However, if poverty is defined as an income below 60 per cent of the average, then the United Kingdom slips to eighth place.

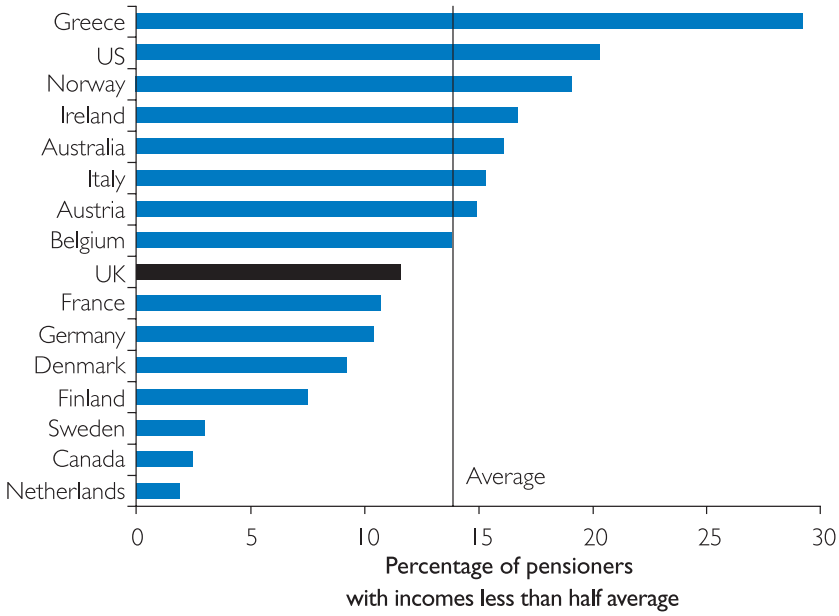
Figure 4.6 Pensioner income poverty rates in 11 countries: percentage of pensioner couples with incomes below half population mean



Source: Whiteford and Kennedy (1995), Table 3.14
Note: the data are from between 1984 and 1987

We end the analysis of poverty rates with the most recent study. Figure 4.7 shows the proportion of pensioners with incomes below half the average in 16 OECD countries as reported by Förster and Pellizzari (2000). The United Kingdom lies around the middle of the distribution with a poverty rate two percentage points below the average for all the countries surveyed.

Figure 4.7 Pensioner income poverty rates in 16 countries: percentage of pensioner couples with incomes below half population mean



Source: Förster and Pellizzari (2000), Table 5.4
Note: the data are from between 1994 and 1995, with the exception of Italy (1993)

Table 4.1 compares the studies that define poverty as having an income below half the average that were presented in the charts above. Five of these analyses are based on the Luxembourg Income Study: those described as Atkinson, Bradshaw, Hauser, Smeeding and Whiteford. In general, they proffer similar results. The correlation coefficients for poverty rates are positive and relatively high: some are significant on standard tests. Moreover, mean poverty rates in the countries that overlap are similar.[50] In two of these studies, the United Kingdom has a relatively low poverty rate (seven and eight per cent respectively). However, in Bradshaw and Hauser, the United Kingdom has a very high poverty rate (36 and 23 per cent respectively). We have already noted that the Bradshaw study appears to exclude housing benefit from the measure of income in the United Kingdom, a treatment not shared by the other analyses. The main idiosyncrasy of the Hauser paper is in the definition of a pensioner: all members (irrespective of their own age) of households headed by someone aged 55 or over in which one or more member receives a pension. The other studies simply count people as elderly using a standard cut-off age and do not count other members of households that contain a pensioner. There are many different effects of this treatment and so it is difficult to isolate which might be responsible for the rather different result for the United Kingdom.

The correlation between these Luxembourg Income Study results and the most recent OECD analysis - labelled Förster, based on responses from national experts - is generally reasonable. The only exception is, again, Bradshaw and Chen's paper.

Table 4.2 summarises different studies' assessment of pensioner poverty in the United Kingdom relative to other countries. One interesting result - which appears common to the three studies that use different proportions of average income as the poverty threshold - is that the United Kingdom looks worse the higher is the poverty line.

The results vary enormously. Some put the United Kingdom at the bottom of the rankings; that is, with the highest pensioner poverty rate. Others paint a rather different picture, with many fewer British pensioners in poverty than their counterparts overseas. If, however, we exclude the Bradshaw and Hauser studies - on account of their idiosyncratic definitions of income and pensioners respectively - then the United Kingdom appears to be in the middle to the bottom of the rankings.

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[50] Comparisons of poverty rates relative to other levels of income can be found in Appendix B.

Table 4.1 United Kingdom ranking in six studies of pensioner poverty rates

	Definition of poverty				
	Bottom	Proportion of average income			
	quintile	40%	50%	60%	70%
Atkinson			3/16		14/16
Bradshaw			14/14		
Förster			9/16		
Hauser		10/14	13/14	14/14	
Johnson	6/8				
Whiteford		3/11	4/11	8/11	

Whiteford and Kennedy (1995) also survey the results of papers based on earlier waves of Luxembourg Income Study data. Appendix B includes a comparison of these with the main studies analysed in this paper.

Table 4.2 Comparison matrix for poverty rates: proportion of pensioners with incomes below half average

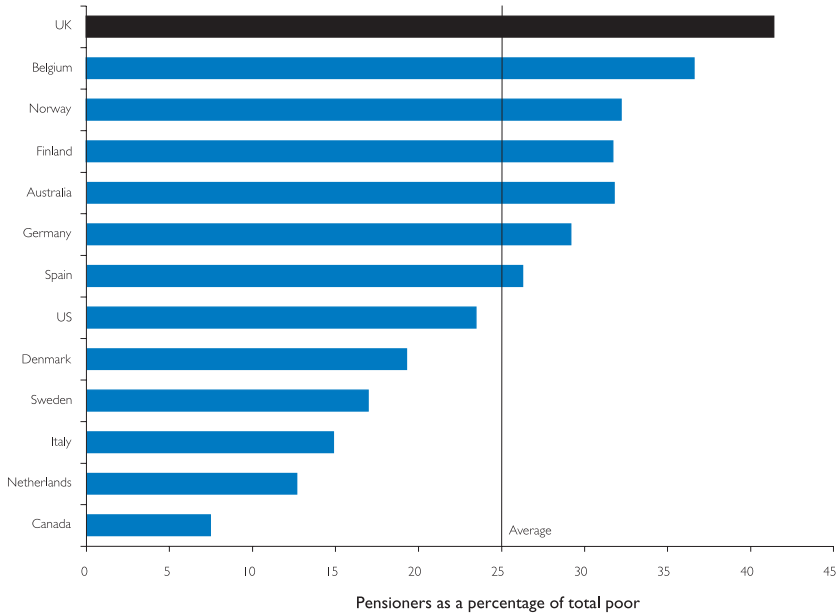
	Bradshaw	Förster	Hauser	Smeeding	Whiteford
Atkinson	Correlation: 0.30 (0.37) Means: 11, 15 Observations: 11 UK:7,36	Correlation: 0.71 (0.00) Means: 11,11 Observations: 13 UK: 7,12	Correlation: 0.49 (0.15) Means: 10,12 Observations: 10 UK: 7,23	Correlation: 0.84 (0.07) Means: 14,16 Observations: 5 UK: 7,n/a	Correlation: 0.94 (0.00) Means: 11,12 Observations: 11 UK: 7,8
Bradshaw		Correlation: 0.46 (0.13) Means: 14,11 Observations: 12 UK: 36,11	Correlation: 0.64 (0.05) Means: 15,13 Observations: 10 UK: 36,23	Correlation: 0.88 (0.05) Means: 18,16 Observations: 5 UK: 36,n/a	Correlation: 0.56 (0.12) Means: 16,13 Observations: 9 UK: 36,8
Förster			Correlation: 0.69 (0.02) Means: 13,12 Observations: 11 UK: 12, 23	Correlation: 0.80 (0.11) Means: 11,16 Observations: 5 UK: 12, n/a	Correlation: 0.74 (0.01) Means: 11,12 Observations: 10 UK: 12,8
Hauser				Correlation: 0.99 (0.07) Means: 12,13 Observations:3 UK: 23,n/a	Correlation: 0.52 (0.15) Means: 12,11 Observations:9 UK: 23,8
Smeeding					Correlation: 0.99 (0.00) Means: 17,19 Observations:4 UK: n/a,8

4.2 Income poverty shares

A second presentation of income poverty data looks at the proportion of the poor that is elderly, rather than the proportion of the elderly that is poor as in the income poverty rates above. Measures of the pensioner poverty share have clear and important implications for the focus of public policies to reduce poverty. The pensioner poverty share is closely related to the poverty rate, but it also depends on the elderly's share of the population as a whole.

The first chart is drawn from Bradshaw and Chen (1996). We have already noted that this study is something of an outlier. The United Kingdom, where more than 40 per cent of the poor are reported as being elderly, is at the top of the chart.

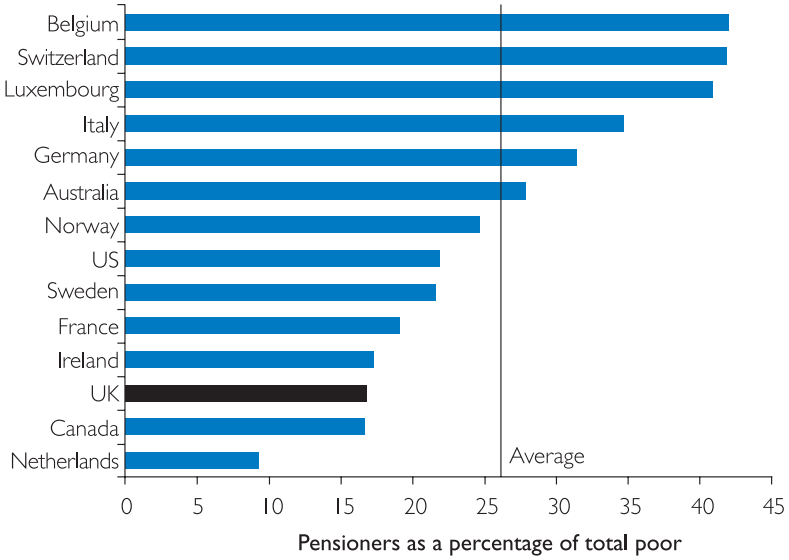
Figure 4.8 Pensioner income poverty shares in 13 countries: pensioners as a percentage of people with incomes below half population average



Source: Bradshaw and Chen (1996), Table 5
Note: the data are from between 1989 and 1992

Atkinson, Rainwater and Smeeding (1995), in contrast, find that the United Kingdom has one of the lowest pension poverty shares: the third lowest, at just under 17 per cent (Figure 4.9). This is substantially below pensioners' share of the population as a whole.

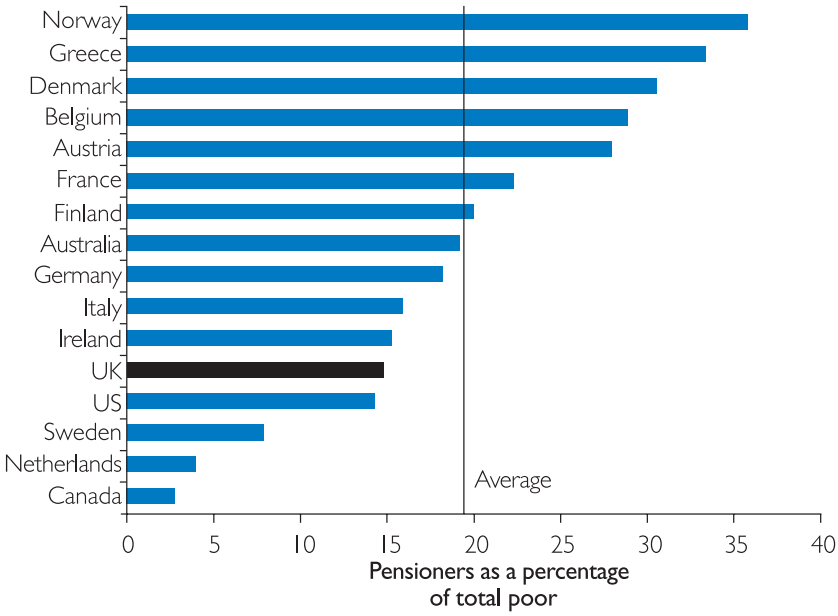
Figure 4.9 Pensioner income poverty shares in 14 countries: pensioners as a percentage of people with incomes below half population average



Source: Atkinson, Rainwater and Smeeding (1995), Table A7.3
Note: the data are from between 1984 and 1987, with the exceptions of Belgium (1988), Finland (1990) and Switzerland (1982)

The results of a more recent study for the OECD - Förster and Pellizzari (2000) - are shown in Figure 4.10. The United Kingdom is ranked in the bottom half of the distribution with a pensioner poverty share of 15 per cent, well below the average.

Figure 4.10 Pensioner income poverty shares in 16 countries: pensioners as a percentage of people with incomes below half population average



Source: Förster and Pellizzari (2000), Table 5.4
Note: the data are from between 1994 and 1995, with the exception of Italy (1993)

The summary Table shows some correspondence between the different studies with the exception of Bradshaw. Förster reports a lower average poverty share than the other studies, although his figure for the United Kingdom is close to Atkinson's. These two studies both point to a low-to-middle pensioner poverty share in the United Kingdom.

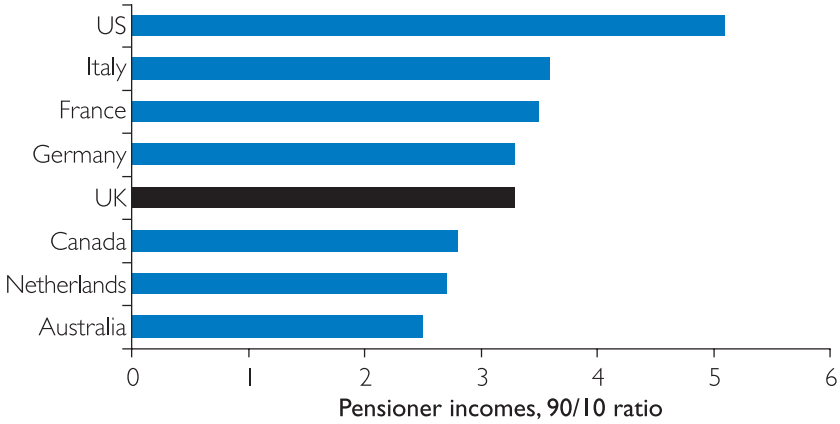
Table 4.3 Comparison matrix for poverty shares: pensioners as a percentage of the population with incomes under half average

	Bradshaw	**Burniaux**	**Förster**
Atkinson	Correlation: 0.39 (0.27) Means: 25,25 Observations: 10 UK: 17,41	Correlation: 0.06 (0.89) Means: 24,22 Observations: 8 UK: 17,n/a	Correlation: 0.58 (0.05) Means: 24,17 Observations: 12 UK: 17,15
Bradshaw		Correlation: 0.27 (0.48) Means: 24,26 Observations: 9 UK: 41,n/a	Correlation: 0.44 (0.15) Means: 25,16 Observations: 12 UK: 41,15
Burniaux			Correlation: 0.49 (0.15) Means: 25,17 Observations: 10 UK: n/a,15

5 PENSIONER INCOME INEQUALITY

This chapter focuses on the distribution of income among pensioners. Figure 5.1 shows a simple measure of income inequality: the ratio of the 90th percentile of the pensioner income distribution to the 10th percentile, called the 90/10 ratio for short. The differences between countries are very large. In the United States, for example, the richest pensioners have incomes more than five times larger than the poorest pensioners, while the ratio is only two-and-a-half in Australia. The size of the ratio in the United States probably reflects the more dispersed distribution of income and earnings generally. The explanation for the pattern in other countries is probably the different structure of the public pension system. The means-tested Australian pension, for example, results in a very equitable distribution of income for pensioners. Canada, the Netherlands and the United Kingdom pay mainly flat-rate public pension benefits, which gives them a lower 90/10 ratio than Italy and France, which have comprehensive earnings-related public pensions paying larger benefits to higher earners.

Figure 5.1 Pensioner income inequality in eight countries: ratio of 90th percentile of pension income to 10th percentile, couples



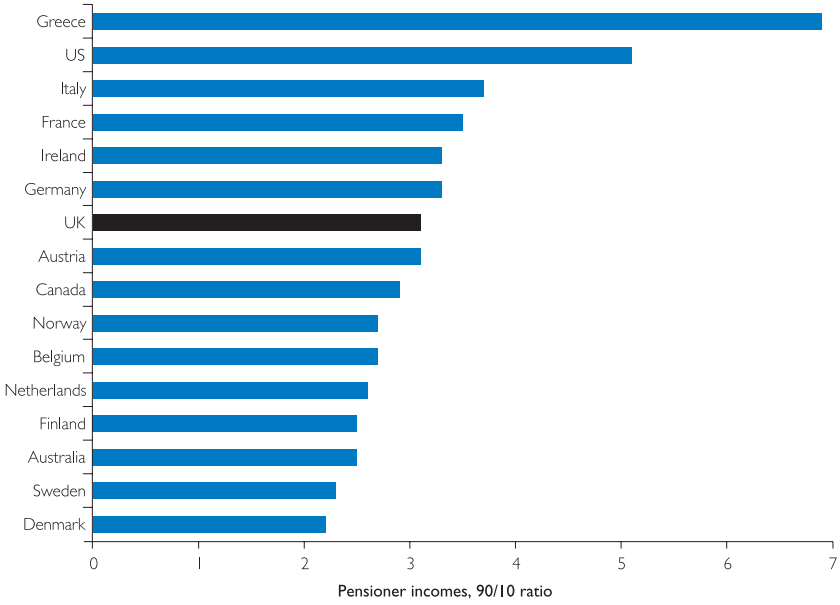
Source: Johnson (1998), Table 4.3
Note: the data are mainly from between 1995 and 1997, with the exceptions of Germany (1993) and the Netherlands (1993-94)

Johnson (1998) also produces 90/10 ratios separately by sex, marital status and age. Typically, the incomes of single men are the most broadly distributed - with the exceptions of Australia and the United Kingdom, where couples' incomes are the most dispersed - but the differences are not large. The pattern is also similar for different age groups. The only exceptions here are Italy, with a large decline in the 90/10 ratio with age, and the United Kingdom, with a modest fall. Johnson also analyses 60-64 year olds who are not in work. This age group has vastly more

unequal incomes than people over pension age in Canada and the United States. This tends to suggest that there are 'two nations' of early retirees: those forced to retire on low incomes because of illness or redundancy and those with generous private pensions and early retirement benefits.

Figure 5.2 shows the same measure of pensioner income inequality drawn from the recent OECD study, Förster and Pellizzari (2000). This study covers a broader range of countries. In the eight countries covered by both this paper and by Johnson's, the correlation between the results is near perfect (0.99, significance level 0.00). The 90/10 ratio in the United Kingdom is reported as 3.1 and 3.3 respectively. Again, the United States has a very high 90/10 ratio, as does Greece (which Johnson does not cover). Again, France, Germany and Italy exhibit greater pensioner income inequality on this measure than the United Kingdom.

Figure 5.2 Pensioner income inequality in 16 countries: ratio of 90th percentile of pensioner income to 10th percentile, couples



Source: Förster and Pellizzari (2000), Table 2.2
Note: the data are from between 1994 and 1995, with the exception of Italy (1993)

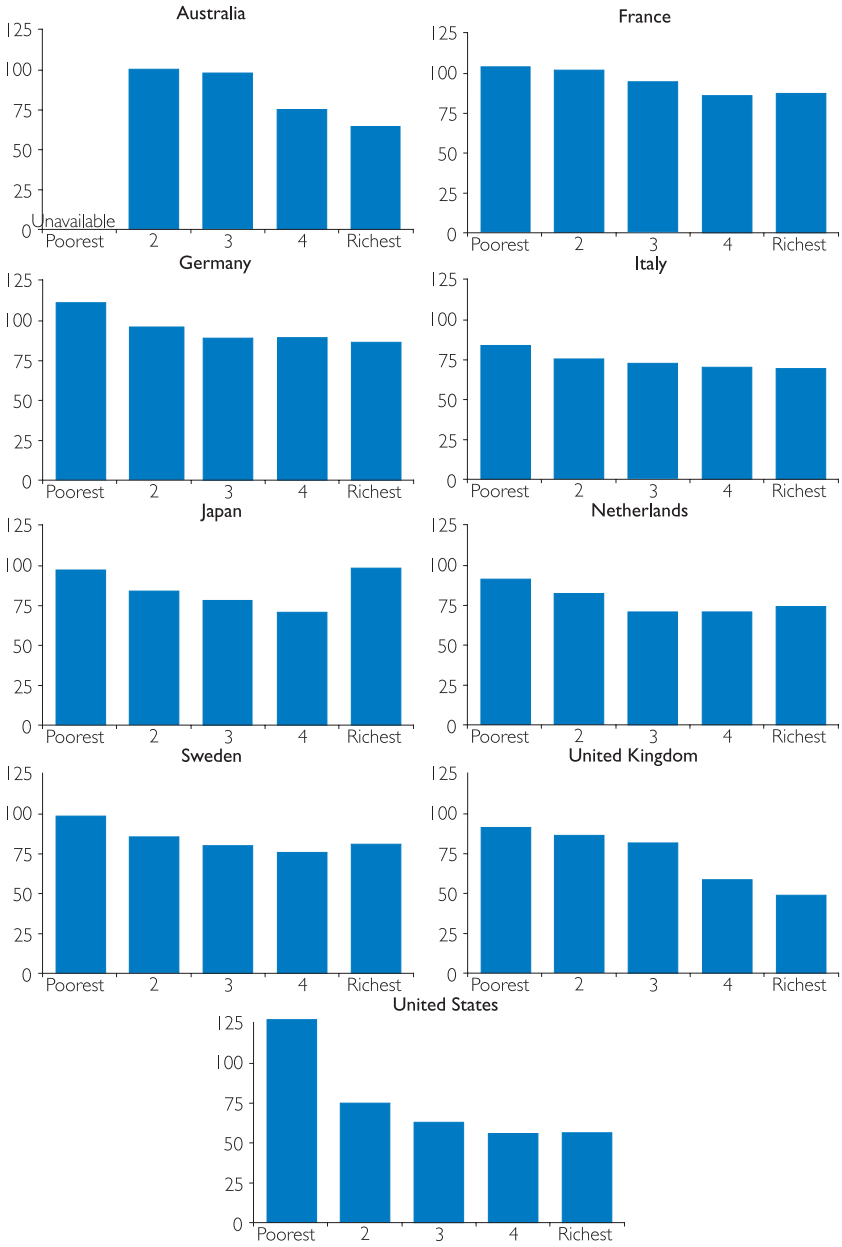
Figure 5.3 takes a different approach to the analysis of the pensioner income distribution. It shows pension replacement rates for different quintiles of the income distribution. Pension replacement rates for the poorest fifth are typically near to 100 per cent, although they are rather larger in Germany and the United States and much lower in Italy. Again, the difference in patterns reflects the philosophy of different countries' pension systems. Flat-rate and means-tested public pensions, designed to ensure that all pensioners have an adequate minimum income, deliver high replacement rates at the bottom of the income distribution but much lower levels of income replacement at the top. This is apparent in the results for Australia and the United Kingdom. The decline in replacement rates with income in the United States reflects the progressive

structure of the pension benefit formula. Italy exhibits the opposite pattern: replacement rates are close to flat across the income range.

Income inequality among pensioners shows very similar patterns between different studies, unlike the measures of replacement rates, poverty and so on that we analysed before. The inequality of pensioner incomes in the United Kingdom lies roughly in the middle. There are two main explanations for the differences between countries. First, the degree of inequality among the working age population is reflected in inequality among pensioners. This probably explains why the United States has a large 90/10 ratio while the Nordic countries have a lower result. The second explanation is the structure of public pension systems. Insurance-based pension systems, such as those in France, Germany and Italy, give bigger pensions to people who were higher earners during their working life. The countries with lower 90/10 ratios often have large means-tested or flat-rate components in their pension systems. This includes Australia, Canada, Denmark, Finland and the Netherlands.

These results are an important complement to the analyses in earlier chapters. The countries with low 90/10 ratios often have lower average pensioner replacement rates. This implies that many cross-country differences in the average living standard of pensioners are generated by the incomes of the richest pensioners rather than by the incomes of the majority.

Figure 5.3 Pensioner incomes as a percentage of non-pensioner incomes by income quintile in nine countries



Source: Börsch-Supan (1998), Table 1

6 INCOME TRENDS

The last four chapters have looked at pensioners' incomes in cross-section, that is, in a single year. Here we extend the analysis to look at how these patterns have changed over time.

6.1 Trends in pensioner incomes

Figure 6.1 is based on three years' data drawn from the Luxembourg Income Study.[51] Generally, the first year's results are from in the mid-1970s, the second from around 1980 and the third from the early-to-mid 1990s. In all three countries bar the United Kingdom, pensioners' incomes have grown significantly faster than the incomes of the population as a whole.[52] In Sweden, the income growth rate for pensioners in each of the three age groups is around 1½ per cent a year faster than the growth of median population income. The differential in the United States is around one per cent a year. In Canada, the incomes of the oldest old (75 and over) have grown much faster relative to the population - around 3½ per cent a year - than younger age groups. For 65-69 year olds, the income growth differential is around 0.8 per cent a year and a little over 1½ per cent a year for 70-74 year olds.

The United Kingdom shows a different pattern, with pensioner incomes increasing at the same rate or slightly slower than the population average in the late 1970s. During the 1980s, however, pensioners of all age groups gained ground, with incomes of 65-74 year olds increasing one per cent a year faster than population incomes.

Over time, these differences in annual growth rates have cumulated into sizeable income gains for the elderly relative to the population as whole. In Canada, for example, incomes of the over 75s doubled relative to population incomes between 1975 and 1994. In Sweden, the average pensioner income was around 30 per cent higher relative to population incomes in the early 1990s than it had been in the mid 1970s. In the United States, the increase exceeds 20 per cent. Even in the United Kingdom, the growth in relative incomes in the 1980s meant that pensioners were nearly 10 per cent better off in 1991 than in 1974, compared with the population as a whole.

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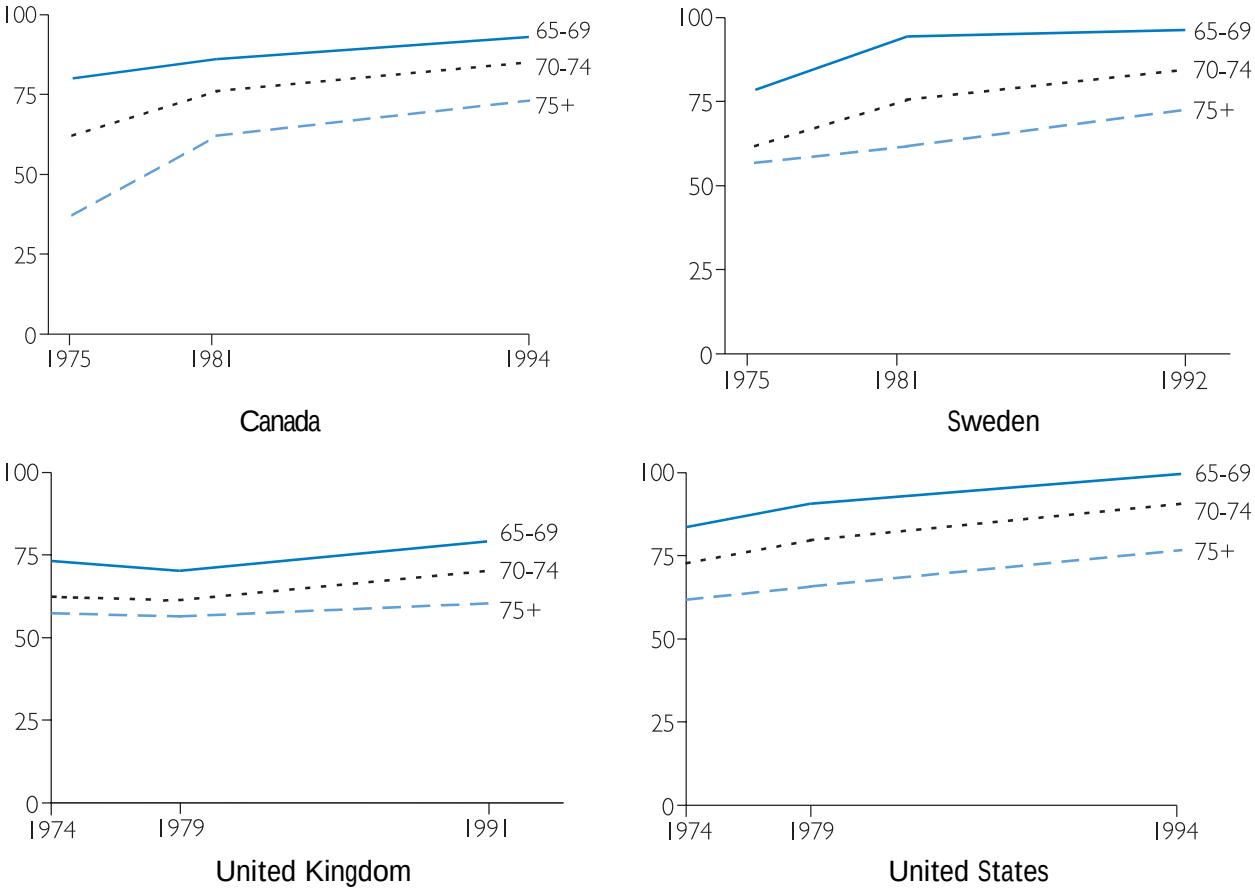
[51] See also Coder, Smeeding and Torrey (1990).

[52] It should, however, be noted that national data sources - the Department of Social Security's Pensioners' Incomes Series and Johnson and Stears (1995), for example - show rather faster income growth for pensioners in the United Kingdom, as does the OECD study discussed below.

Figure 6.1 Income trends in four countries: median incomes of the elderly relative to the population median



Source: Smeeding and Sulivan (1998), Appendix Table 1

Förster and Pellizzari (2000) provide a broader analysis of the trend in the relative incomes of the elderly, covering 13 countries. The data compare the mid-1990s with the mid-1980s. Table 6.1 gives the results as the percentage change in the replacement rate over the decade or so.[53] Pensioners' incomes increased faster than those of the population as a whole did in nine of the 13 countries. The mean change is a two per cent increase in the replacement rate. The elderly in the United Kingdom seem to have done particularly well, with an increase in the replacement rate of over five per cent: the fourth highest increase, and close to Canada, France and Germany, which also show large gains. The sizeable decline in pensioners' relative incomes in Ireland is probably a reflection of the rapid growth of the economy, which has seen large increases in earnings.

[53] Förster and Pellizzari report the results as absolute percentage point changes in the replacement rate. Here they have been transformed to (relative) percentage changes. The original data are presented only for the two age groups separately. Data for all pensioners have been derived using 1990s levels and 1980s-to-1990s changes in population shares to provide the relevant weights for averaging across the two age groups.

Table 6.1 Percentage change in replacement rate by age group between the mid-1980s and the mid-1990s in 13 countries

	Change in replacement rate (%)		
	All	Age 65-74	Age 75-
Canada	6.0	8.5	0.7
Denmark	4.0	6.5	1.4
Finland	1.5	1.7	1.1
France	6.3	8.6	1.4
Germany	5.5	8.9	1.2
Greece	-2.9	-5.7	0.0
Ireland	-6.9	-9.2	1.4
Italy	3.0	3.6	1.9
Netherlands	-1.8	-2.9	0.8
Norway	4.3	8.6	2.3
Sweden	3.9	6.4	-1.6
United Kingdom	5.4	8.0	1.0
United States	-0.7	-0.3	0.9

Source: authors' calculations based on Förster and Pellizzari (2000), Table 2.3

Note: see Appendix Table A.10 for a list of the exact years for which the data are drawn

Income changes in virtually all the countries vary significantly between the two age groups. In nine of the 13 nations, gains are much larger for younger pensioners than for the over 75s. The gain for the younger pensioners averages two percentage points higher than for the older age group. In the United Kingdom, younger pensioners saw an eight per cent increase in their incomes relative to the population as a whole, compared with only one per cent for the over 75s. As we have discussed elsewhere, this is probably a cohort effect arising from the maturing of SERPS and occupational pension benefits. Other countries, such as Canada, Germany and Sweden, however, exhibit still greater differences in replacement rates between the age groups.

Figure 6.2 Interpreting changes in the incomes of the elderly over time: the effect of compositional changes

Comparisons of pensioners' incomes over time can be distorted by changes in the composition of elderly households. Improvements in life expectancy, even if enjoyed equally by different groups, will change the distribution of pensioners, for example, between single men, single women and married couples.

In the United Kingdom, for example, the Department of Social Security's Pensioners' Incomes Series seems to contain an odd paradox. Both pensioner couples' and single pensioners' net incomes were 60 per cent higher on average in 1996-97 than they were in 1979, but pensioners' incomes as a whole grew by 64 per cent. The answer to this apparent riddle is compositional change: if the proportion of couples and singles is kept the same as in 1979, the overall pensioner income growth rate is 60 per cent. Fewer than 48 per cent of pensioners were in couples in the early 1960s, rising to over 55 per cent in the early 1990s, despite the growth in divorce over the period (Goodman and Webb, 1994, Table 3.1).

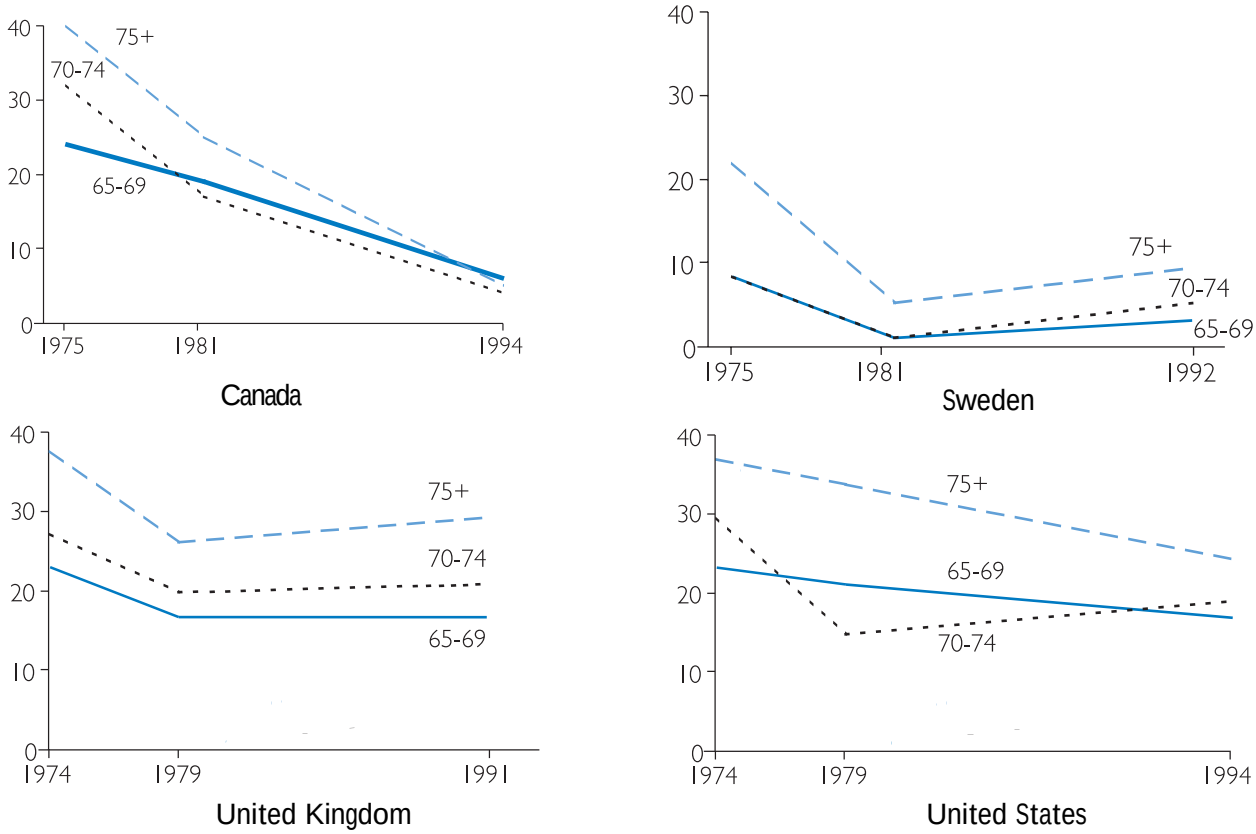
There is, perhaps more surprisingly, a compositional effect of this sort on recently retired pensioners' incomes (people in the first five years after state pension age). The unadjusted growth in net incomes from 1979 to 1996-97 was 75 per cent. Adjusting for compositional changes, the growth rate was 72 per cent.

This, of course, raises another compositional effect in time series comparisons: the ageing of the old. Section 2.2 showed that pensioner incomes tend to decline with age, both because of cohort effects on lifetime income and earnings and because of the maturing of pension schemes over time. Measured average incomes of pensioners are likely to be depressed over time as the proportion of older pensioners, with lower average incomes, increases as longevity increases. Unfortunately, the data source used in this example has insufficient information to permit correction for age compositional changes.

6.2 Trends in pensioner income poverty

Figure 6.3 shows that the widespread increase in pensioner prosperity found in Figure 6.1 was, in most countries, broadly based. The proportions of pensioners with low incomes fell very dramatically in Canada, from 25-40 per cent (depending on age) in the mid 1970s to under 10 per cent by the mid 1990s. In Sweden and the United Kingdom, declines in pensioner income poverty rates in the late 1970s were partially reversed in the 1980s. Nevertheless, poverty rates for all age groups were still lower at the end of the period than at the beginning. A similar pattern is observed for 70-74 year olds in the United States, but poverty rates consistently declined for younger and older groups.

Figure 6.3 Poverty trends in Canada, Sweden, the United Kingdom and United States: proportion of the elderly with incomes below half the population median, mid 1970s to mid 1990s



Source: Smeeding and Sulivan (1998), Appendix Table 1

Figure 6.4 Income and consumption based measures

The advantages and disadvantages of expenditure as a measure of welfare were set out in Section 1.4. This figure presents some results for the United Kingdom to illustrate how very different the relative economic status of the elderly looks when measured using consumption rather than income.

Pensioner income-poverty rates and shares have declined sharply in the United Kingdom as in most OECD countries. In the late 1960s and early 1970s, pensioners made up around 40 per cent of the bottom income decile, but this fell sharply in the early 1980s and again in the early 1990s to reach 17 per cent by 1993. (Goodman, Johnson and Webb, 1997; Goodman and Webb, 1995). There are proportionately more pensioners in the bottom decile of household expenditure. From the late 1960s to the early 1980s, the elderly share of the low-spending group was around a half. This fell to 40 per cent in the early 1980s, but the late 1980s consumption boom seems to have led to a divergence. The proportion of the old in the bottom spending decile increased again to a peak of 50 per cent. This was reversed in the early 1990s.

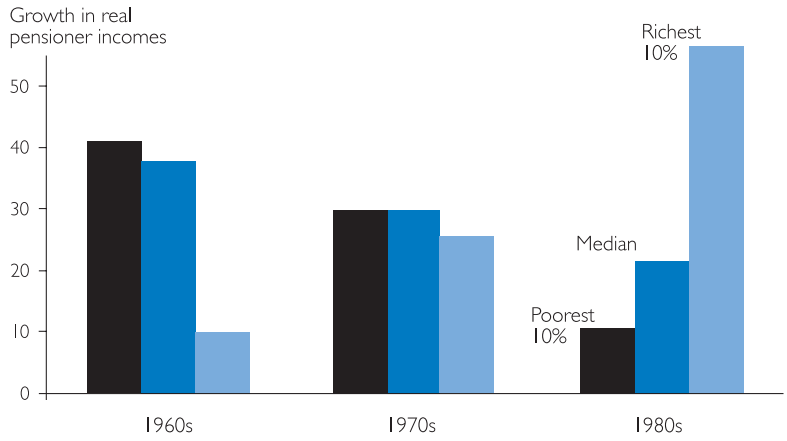
However, the important message is that the improvement in the economic position of Britain's elderly measured with expenditure looks much smaller than measured with income.

6.3 The changing distribution of pensioner incomes

This section shows how the distribution of pensioner incomes has changed over time. This is the time-series counterpart to the cross-national comparison of income distributions in Chapter 5.

Continuing with the focus on the United Kingdom, Figure 6.5 compares incomes across a 30 year period: from 1961-62 to 1991-92. The left-hand bar shows how much higher the incomes of the poorest ten per cent of pensioners were at the end of a decade than at the beginning. The middle bar compares median incomes and the right-hand bar the top ten per cent. During the 1960s and 1970s, the pensioner income distribution narrowed considerably. Median and bottom-decile incomes grew by three and a half per cent a year in the 1960s and two and three-quarter per cent a year in the 1970s. The richest pensioners at the end of the 1960s were only ten per cent better off than their counterparts at the beginning of the decade. Although the differences in growth rates by income level narrowed in the 1970s, they were entirely reversed during the 1980s. The real incomes of the richest pensioners grew by four and a half per cent a year, the median by less than two and a half per cent a year and the bottom decile by just one per cent a year.

Figure 6.5 The changing pensioner income distribution in the United Kingdom, 1961-92



Source: Johnson and Stears (1995), Table 7
Note: 1960s refers to the period 1961-62 to 1970-71 inclusive, 1970s to 1971-72 to 1981-82 etc. Incomes are equivalised

Johnson and Stears' (1995) results are confirmed by more recent official data. The Department of Social Security (2000a) estimates that the top quintile of pensioner couples had 80 per cent higher incomes in 1996-97 than their counterparts in 1979, an annual growth rate of three and a half per cent.[54] The bottom quintile grew by 34 per cent over the same period, equivalent to a little under one and three-quarter per cent a year, less than half the growth rate at the top of the income distribution. This differential, however, is rather smaller than Johnson and Stears' results for the period 1981-82 to 1991-92.

[54] The results are fairly similar for single pensioners: the top quintile income in 1996-97 was 76 per cent higher than in 1979 while the bottom quintile was 28 per cent higher.

The reason for the broadening of the income distribution in the 1980s and 1990s is the rapid growth of private pension and investment income. While the richer majority enjoyed the fruits of this growth, a poorer minority of pensioners is dependent on state benefits whose value has increased little in real terms since 1980.

Australia shows a more complex time-series pattern in the distribution of pensioner incomes than the United Kingdom. Table 6.2 presents a basic measure of income inequality: the Gini coefficient. The higher the coefficient, the more unequal the distribution of incomes. The distribution of pensioners' incomes narrowed in the early 1980s, but by the end of the decade, the degree of inequality was similar to its level at the beginning. However, the distribution narrowed again in the 1990s.

Table 6.2 Gini coefficient for pensioner incomes in Australia, 1982 to 1995-96

1982	1986	1990	1995-96
0.31	0.23	0.32	0.29

Source: King, Harding and Walker (1999)

Table 6.3 looks at poverty shares in Australia. In the early 1970s, almost half of the poor were pensioners, but this had fallen to less than 30 per cent by 1996. Their place among the poor has been taken mainly by low-income workers.

Table 6.3 Characteristics of the poor in Australia, 1972-73 and 1996

Per cent	**1972-73**	**1996**
Old	46	29
Working age		
Out of labour force	27	29
In labour force	27	42

Source: *King (1998)*

7 INCOME SOURCES

This chapter extends the analysis by breaking down pensioners' total incomes into their different sources. The most important single source of income is, of course, public transfers, including both public pensions and social-assistance benefits.[55]

Figure 7.1 shows the replacement rate of total income and the replacement rate from public transfers in a series of OECD countries. In France, Germany and, especially, Sweden, the vast majority of the elderly's income comes from the state. In other countries, however, there is a large gap. In Italy, the elderly are more likely than in other OECD countries to live with their children or other relatives (see Table 1.1). In Australia, Japan, the Netherlands, the United Kingdom and the United States, private pension incomes are particularly important (see Table 7.1).

The important part played by governments in the development of private pensions should be noted. This is not simply confined to the passive role of leaving 'space' for the development of private pensions by having a limited public pension programme. Perhaps most important is the role of tax reliefs on pension contributions and pension fund investment returns. This has played an important part in the growth of occupational and personal pensions in the United Kingdom and similar plans elsewhere. In the United States, for example, these include individual retirement accounts (IRAs), Keogh plans and 401(k) plans. Canada's registered retirement savings plans (RRSPs) have also seen rapid growth.[56] But there have been other significant contributions to the development of private pensions in the United Kingdom. These include the rules for contracting out of SERPS and the regulation of occupational pension funds.[57] A series of measures since the 1970s vastly improved the protection of the pension rights of 'early leavers'. These regulations have played a central role in the rapid growth of occupational pension income in the 1980s and 1990s.

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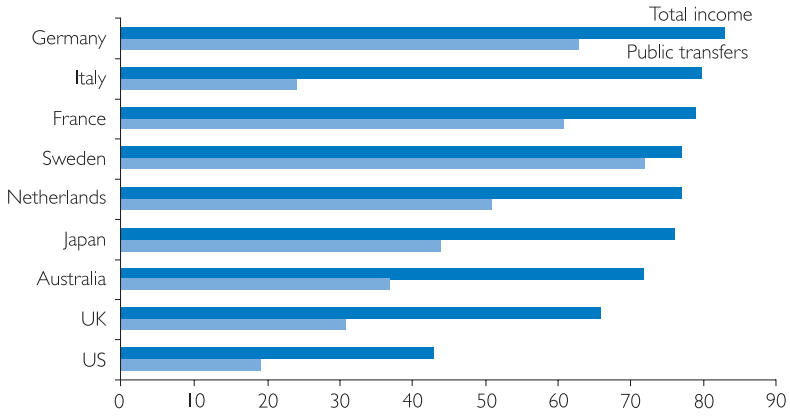
[55] See Kohl (1992) in addition to the studies surveyed here.

[56] See Whitehouse (1999) for a discussion of the taxation of private pensions.

[57] See the discussion of these rules in Section 9.4 and in Disney and Whitehouse (1992*a*,*b*).

Figure 7.1 Ratio of pensioners' transfer and total incomes to older workers' incomes in nine countries, couples



Source: Disney, Mira d'Ercole and Scherer (1998), Figure 1
Note: compares income of households where the head is aged circa 67 with households where the head is circa 55. The data are from between 1992 and 1995, with the exceptions of the United Kingdom (1988-89) and the Netherlands (1990).

Figure 7.2 extends the analysis to look at the role of transfer incomes at particular points of the income distribution. The top chart looks at the poorest pensioners and the bottom chart, at the richest. Unsurprisingly, poorer pensioners everywhere rely on the state for the vast majority of their income. Some differences begin to emerge in the middle income quintile, but they become much more apparent at the top of the income distribution. The comprehensive social-insurance schemes in France, Germany and Italy mean that the richest pensioners still get the majority of their income from the state. Indeed, the proportion in France and Italy is only slightly below the proportion for the bottom income quintile. The other countries all have predominantly flat-rate public pension systems, or earnings-related public schemes with highly progressive formulae. In Australia, Canada, New Zealand and the United States, only around a fifth of the income of the richest quintile of the elderly derives from public pension programmes.

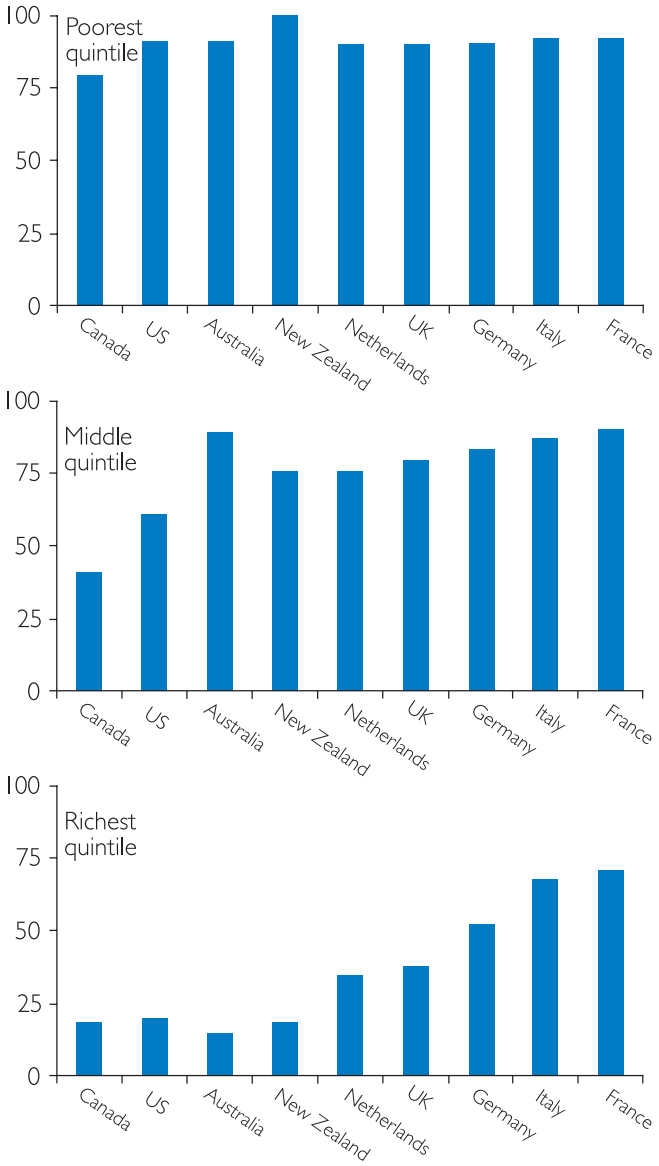
Table 7.1 Percentage of pensioners with income from employer-provided pensions in eight countries, late 1990s

Per cent	All	Men	Women
Australia		20	7
Canada	41	54	31
Germany		21	9
Japan	10		
Netherlands	50	76	23
New Zealand	11		
United Kingdom	49	66	32
United States	36	48	26

Source: Johnson (1998), Table 3.3; Johnson (1999), Table OP1

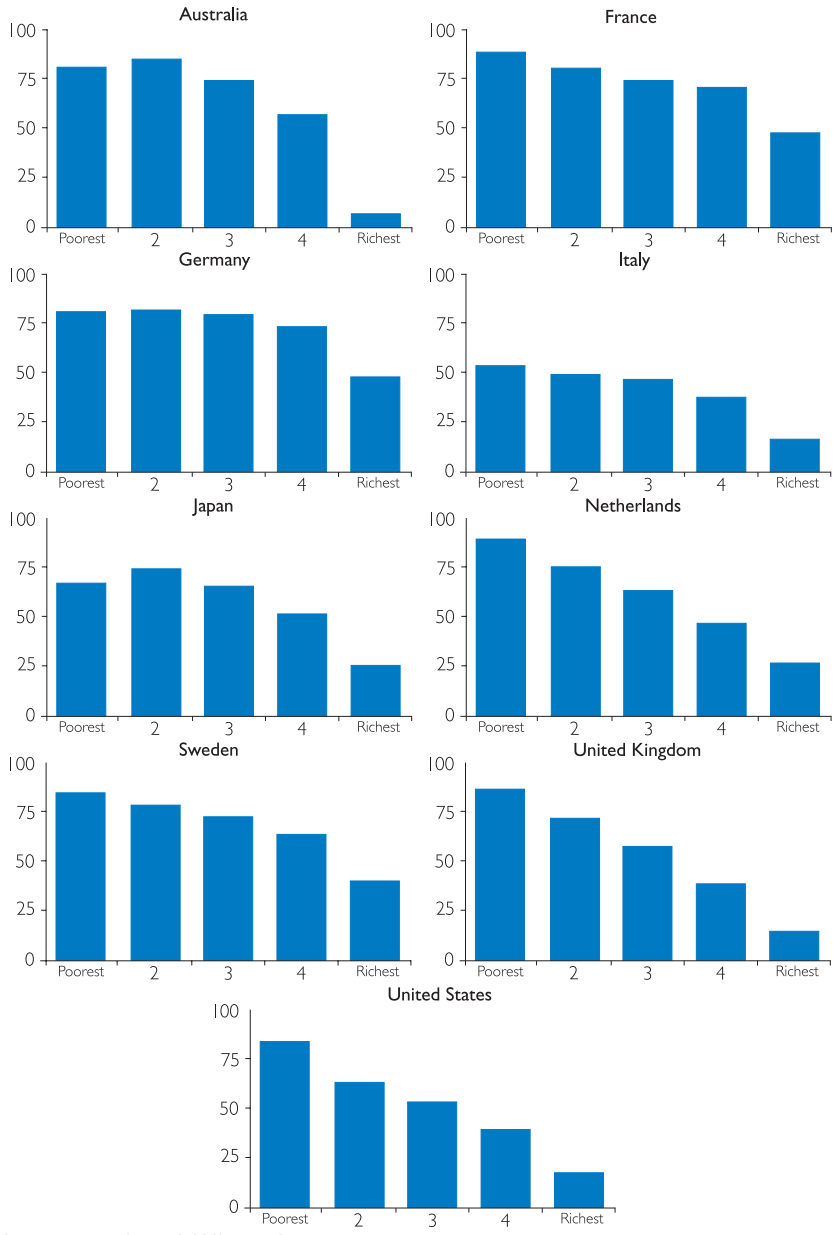
These results are broadly confirmed by a second study of OECD countries (Börsch-Supan, 1998), shown in Figure 7.3. The differences between the two are probably accounted for by the different samples (Figure 7.2 looks at younger pensioners) and in the choice of measurement unit. Italian pensioners, for example, receive much less of their income from the state, according to these data. Richer pensioners in France and Italy also appear to have much lower proportions of public benefit income at the top of the income distribution than Johnson reports. In addition, the decline in the role of the state with income is much more pronounced in the United Kingdom.

Figure 7.2 Percentage of pensioners' income from public pensions and other state benefits in nine countries, by quintile of the income distribution



Source: Johnson (1998), Table 4.4
Note: the data are mainly from between 1995 and 1997, with the exceptions of Germany (1993) and the Netherlands (1993-94).

Figure 7.3 Percentage of pensioners' income from public pensions and other state benefits in nine countries, by income quintile



Source: Börsch-Supan (1998), Table 2

7.1 Changing sources of incomes over time: the United Kingdom

Tables 7.2 and 7.3 analyse how the sources of pensioners' incomes in the United Kingdom have changed since the end of the 1970s. The role of the state has declined. Back in 1979, over 60 per cent of the elderly's incomes came from the state. This fell to a minimum of just 50 per cent in 1992. There has also been a shift in the structure of state support for the elderly. In 1979, the basic state pension, the flat-rate (near) universal benefit, accounted for the vast majority of public transfers. Payments under the earnings-related public pension (SERPS) have only now begun to grow, since the system was introduced in 1978. There has also been growth in the role of the main social-assistance benefit (now known as Income Support or, for pensioners, Minimum Income Guarantee (MIG)) and in other transfers (principally means-tested payments to help with housing costs and local taxes).

Table 7.2 Changing sources of pensioner incomes in the United Kingdom, 1979 to 1996-97 (Family Expenditure Survey data)

Per cent of total income	1979	1989	1992	1994-95	1995-96	1996-97
Benefits	61	52	50	52	51	53
of which:						
Basic state pension	52	40	37	37	36	38
SERPS	0	1	2	3	3	4
Income support	4	4	5	6	6	5
Others	5	6	6	6	6	6
Occupational pension	16	22	24	25	24	26
Investments	11	18	20	15	16	14
Earnings or other	12	8	7	8	9	7

Source: Department of Social Security (2000a,c,f)

Note: the split of total benefit income is derived by adjusting using aggregate benefit spending on the elderly. Since the Family Expenditure Survey sample differs from the population of benefit recipients (principally due to the exclusion of the institutional population), the split should be treated as illustrative only. See Appendix A.6 for a discussion of the data

The biggest growth has been in employer-provided pensions. The spread of occupational-pension membership among the workforce, which peaked in the 1960s, is still feeding through to higher pension benefits. Also, a series of legislative and regulatory changes in the 1970s and 1980s have improved the protection of occupational pension rights of people who change jobs before retirement and in post-retirement indexation of benefits. Investment incomes also grew strongly over the period. However, income levels respond strongly to changes in interest rates. Rates were very high in the late 1980s and early 1990s, but have since fallen to their lowest level since the 1960s.[58] Finally, the role of earnings continually diminished as labour-force participation of the elderly has declined.

[58] See, however, the discussion of measuring capital incomes in Section 9.1 below.

Table 7.3 Changing sources of pensioner incomes in the United Kingdom, 1994-95 to 1997-98 (Family Resources Survey data)

Per cent of total income	1994-95	1995-96	1996-97	1997-98
Benefits	53	55	53	52
of which:				
Basic state pension	*39*	*40*	*38*	*38*
SERPS	*2*	*5*	*5*	*5*
Income support	*6*	*4*	*4*	*4*
Others	*6*	*7*	*6*	*6*
Occupational pension	25	25	26	26
Investments	14	12	13	13
Earnings or other	8	7	8	8

Source: Department of Social Security (2000a,c,f)

Note: see notes to Table 7.2

8 INCOME AND POVERTY DYNAMICS

Much of the debate on incomes of the elderly is based on the implicit or explicit prior assumption that there is little if any movement in pensioners' incomes, although the exception of widowhood is usually acknowledged. Pensioners who are poor in one period are expected to remain poor in the future. In fact, the small number of studies that include analysis of income and poverty dynamics among the elderly show a surprising degree of mobility.[59]

There is, however, a very important general caveat that applies to studies of income and poverty dynamics. In cross-section studies, the process of aggregation cancels out (or at least substantially mitigates) the problem of measurement error. In contrast, studies of dynamics rely on comparing differences in incomes at two different points in time and both incomes are measured with error. This compounds the effect of measurement error. Nevertheless, the policy implications of the dynamics of pensioners' incomes are profound.

There have been few studies of income and poverty dynamics in an international context due to the scarcity of panel data (particularly long panels) in most countries. Antolín, Dang and Oxley's (1999) study for the OECD is one exception, but the data for the United Kingdom are based on pre-tax incomes while net incomes are used for the other three countries covered.[60] This substantially overstates poverty rates in the United Kingdom and so is not particularly useful for our purposes.

The Department of Social Security's (2000d) income-distribution analysis now includes data on income dynamics drawn from the British Household Panel Survey. These data show that 17 per cent of pensioner couples were persistently poor, in that they spent four years in the bottom 30 per cent of the overall income distribution. This compares with 13 per cent of the population as a whole. Single pensioners were, however, much more likely to be persistently poor, with 33 per cent remaining in the bottom 30 per cent of the income distribution. This suggests a reasonable degree of income mobility among the elderly, especially among pensioner couples. Jarvis and Jenkins (1996) found that single and married pensioners made up 19 and nine per cent respectively of the people who escaped from a low income during a four-year period, close to their population shares.

[59] There is a number of studies of income and poverty dynamics of the elderly in the United States, including Burkhauser, Holden and Feaster (1988) and Holden, Burkhauser and Myers (1987).

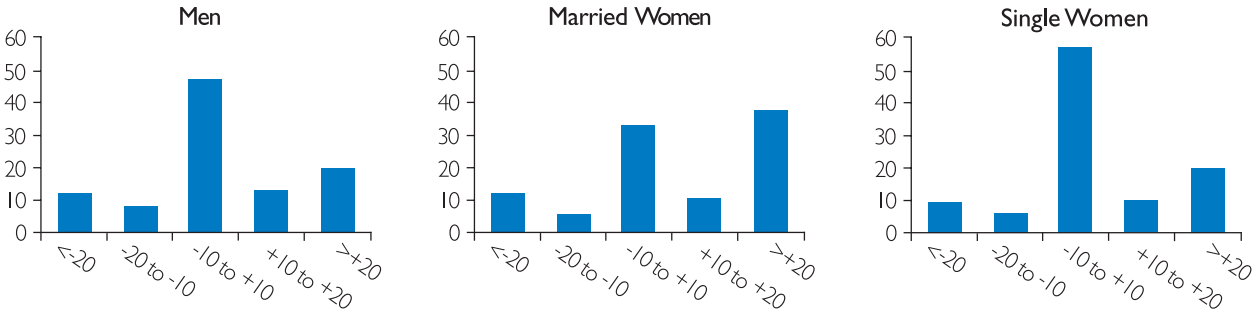
[60] See also the analysis of the European Community Household Panel in Mejer and Linden (2000) and Duncan (1993) on eight countries.

8.1 Income dynamics

Other studies have looked directly at changes in pensioners' incomes, rather than indirectly through poverty measures. Another dataset in the United Kingdom - the Retirement Survey - covers the same group of older people in 1988-89 and 1994. Figure 8.1 shows that most people's incomes were close to unchanged between the two years, between plus and minus 10 per cent. However, a substantial group had large changes in incomes between the two waves of the survey: some exceeding a 20 per cent increase, others falling by more than 20 per cent.[61]

Interestingly, income changes over time were equalising. The incomes of the richest 40 per cent of pensioners barely changed in real terms between the two surveys. In contrast, pensioners in the bottom income quintile enjoyed an income increase of over 20 per cent and the second and third income quintiles saw growth of over 10 per cent.[62] Note that these changes relate to the same pensioners over time, unlike the results in the section on income trends.

Figure 8.1 Change in pensioner incomes by sex and marital status in the United Kingdom, 1988-89 to 1994



Source: Johnson, Stears and Webb (1998)
Note: 'Single Women' category includes never-married women and widows who were widowed before the first wave of the sample. Women who were widowed between the two survey waves are discussed below.

8.2 Widowhood

Hurd (1990) observed that 'the transition to widowhood itself seems to induce poverty'. Section 2.1 showed that single female pensioners, the majority of whom are widows, have lower incomes than single men or married couples. However, a complete understanding of the effects of widowhood on living standards can only be gleaned from direct comparison of post-bereavement incomes with the combined income of the couple before the spouse's death. This section looks at the evidence from the United Kingdom Retirement Survey.[63]

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[61] See Webb (1997) in addition to Johnson, Stears and Webb (1998).

[62] Johnson, Stears and Webb (1998), Table 4. Incomes excluding earnings of men aged 65-69 in 1988-89.

[63] This section is based on Johnson, Stears and Webb (1998). See also Burkhauser, Butler and Holden (1991) on the United States.

Women who were widowed between the 1988-89 and 1994 waves of the Retirement Survey had an average real income of £127 a week, compared with £175 a week for the couple before widowhood. The largest component in the income decline is in occupational pensions, accounting for nearly a third of the fall. Only one in five widows have an occupational pension from their own contributions. Although three out of five inherited some pension from their deceased husband, the value of the survivor's pension is typically around 50 per cent of the couple's pension.[64] There is a similar decline in receipt of state benefits. While the value of the state pension is broadly the same, income from other state benefits is much lower after widowhood (usually because of the loss of the husband's invalidity benefits).

What is the impact of the £50-a-week income fall on living standards? After bereavement, the income only has to support one rather than two people. The ratio of the average income of the couple before widowhood to the income of the widow after bereavement is 175/127 = 1.38. The method for comparing incomes of households of different sizes by economists is the equivalence scale (see Appendix C for a detailed discussion). The equivalence scale in this case would show the income level that would give the same standard of living to the single pensioner as to the couple before widowhood. The scales used in the various studies in this paper range between 1.41 and 1.7 in the ratio of a couple's income to a single person's. Taking reciprocals of all these numbers, we find that the widow has an income of £127/£175 = 73 per cent of the couple's income. The equivalence scales suggest that if she had an income of between 59 and 71 per cent (i.e., 100/1.7 to 100/1.41), she would be as well off as she was before bereavement. The benefits system in the United Kingdom assumes that a single person needs 60 per cent of the income of a couple. On all of these (implicit and explicit) equivalence scales, therefore, the widow can, in this average case, afford a better living standard than before the loss of the husband.

How can we reconcile these results with the single female pensioners' relatively low incomes reported by cross-section studies? The answer is that widows tend to come from poorer families in the first place: an effect of differential mortality by income. Husbands who survived between the two waves of the survey had an average occupational pension of £65 a week in 1988-89 and average investment income of £26 a week. This was much higher than the private incomes of husbands who died, which averaged £49 and £12 a week respectively. Total private incomes were

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[64] Studies have found a sizeable negative effect of widowhood on incomes in the United States: see, for example, Hurd (1989), Hurd and Wise (1989*a*) and Burkhauser, Butler and Holden (1991). This has been attributed, in particular, to poor provision for survivors' benefits in private pensions. In the United Kingdom, however, most occupational pension schemes offer a reasonable level of survivors' benefits, partly because this is a requirement for contracting out of SERPS.

therefore over 40 per cent higher for men who survived than men who died. In addition, 64 per cent of couples where both spouses survived between the two waves owned their own homes, compared with just 46 per cent where the woman was widowed.[65] This differential-mortality effect means that cross-section comparisons of incomes by sex and marital status should be interpreted with caution.

[65] Disney, Johnson and Stears (1998).

9 INCOME CONCEPTS

The papers surveyed have all followed a broadly similar approach to defining income. Nevertheless, this standard method has a number of shortcomings: some are general, applying equally to national studies of income distribution; others are specific to the international comparisons of concern here.

9.1 Capital income

The standard 'statistical' measure of income used in distributional analyses is governed by data availability.[66] This statistical measure typically differs from a desirable 'economic' measure of income. The basic economic measure arises from the Haig-Simons[67] definition: the change in net economic wealth between two points in time plus consumption in that period. Put another way, this economic definition of income is how much someone could spend in a particular period while leaving him- or herself no worse off at the end of the period.[68]

However, this economic definition is difficult to put into practice because it requires data on both consumption flows and wealth stocks. Household surveys often do not ask questions about wealth stocks, only about income flows. Even surveys that do ask about wealth typically do so only at a single point in time. The standard statistical measure of income - including capital income earned during the relevant period - is an approximation to the economic definition, but it differs in two important respects.

First, it ignores capital gains. If capital gains are measured in surveys, they are usually measured only on a realised basis. Accrued (or unrealised) capital gains are very difficult to measure. Secondly, the statistical measure does not take account of the effect of inflation. The Haig-Simons definition of income makes little sense if presented in nominal terms: income should be the amount one can spend leaving the *real* value of wealth intact, not the *nominal* value. Yet, the standard measure typically includes nominal capital income as income.

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[66] Although it could also be argued that it is a microeconomic version of the income definition used in national-accounts studies.

[67] Haig (1921) and Simons (1938). Goode (1977) argues persuasively that von Schanz anticipated the Haig-Simons definition in 1896 and so prefers 'Schanz-Haig-Simons'.

[68] This is similar to Hicks' (1946) definition but Hicks implicitly excludes irregular sources of income, such as capital gains. By writing that income is 'the maximum amount of money which the individual can spend this week, and still expect to be able to spend the same amount in real terms in each ensuing week', he appears to foreshadow Friedman's permanent income hypothesis (see below). The Haig-Simons definition implicitly includes non-recurring sources of income.

The effect of including nominal capital incomes in the standard measure is to distort comparisons when inflation rates differ. The Department of Social Security's Pensioners' Incomes Series, for example, shows a decline in pensioners' investment incomes in the early 1990s. During this period, United Kingdom base rates fell from 15 per cent to less than half that level. This was a major factor behind the fall in investment incomes, shown above in Table 7.2. But inflation also fell over the period: from a peak of nearly 11 per cent to less than three per cent, leaving real interest rates fairly stable. The fact that real interest rates were fairly stable implies that the measured decline in the level of investment incomes overstates the change in economic income according to the Haig-Simons criterion.

It is sensible to think of interest as consisting of two components: the first, compensation for inflation and the second, the real return (if real rates are positive). People can safely spend the real component of their interest earnings while leaving their wealth intact, as in the Haig-Simons definition of income. However, if they spent their nominal interest in each period, the value of their wealth would fall, with the rate of decline varying with the rate of inflation in each period.

Similar problems occur in international comparisons between countries with different inflation rates. Higher inflation countries would appear to have relatively richer pensioners (since the elderly tend to have higher stocks of wealth than the population as a whole). Again, there is a potential case of money illusion. If pensioners in higher-inflation countries spent their nominal interest, then their stock of wealth would decline more rapidly. The Haig-Simons definition of income can be thought of as a measure of consumption possibilities without saving or dis-saving. Including nominal interest in the income measure necessarily implies some dis-saving at any positive inflation rate.[69]

A possible correction would be to include only real investment income. However, the data requirements of such an adjustment would be onerous. We would need to know the capital income from each source as well as the value of the assets in each source to convert the nominal return into a real return.

Nevertheless, the Haig-Simons approach, while economically robust, may not be appropriate for a study of the incomes of the elderly. It assumes that the elderly's command over resources is limited such that they would still have their current wealth stock left when they die. The Haig-Simons definition of income underlies Friedman's (1957) permanent income hypothesis - that expenditure is determined by the 'permanent' level of income, not by transitory ups and downs - which explicitly

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[69] See Vanoli and OECD (1996*b*) on alternative measures of interest in national accounts under inflationary conditions.

assumes that people have infinite lives. In this case, people would want to leave their net wealth position intact. Returning to the real world, where lives are finite, it seems reasonable to suggest that pensioners might finance some of their spending from running down their wealth. Indeed, such behaviour is the standard prediction of the lifecycle model of consumption.[70] This process is automatic in pension schemes that provide annuities: the payment stops when the beneficiary (or any survivor) dies. Net wealth is obviously zero at that point. This applies to all public benefits and the majority of occupational and personal pension benefits. Most other assets, however, are not in the form of annuities.

The corollary of holding wealth in non-annuitised forms is that people will leave unintended bequests. Because life expectancy is uncertain, people will run down their assets slowly to ensure that they do not run out of resources before they die. However, it is difficult to disentangle these unintended bequests from people's express wishes. Extensions of the lifecycle consumption model have looked at altruistic and strategic reasons for wanting to leave bequests.[71] The desire to bequeath wealth might suggest a return to the Haig-Simons definition of income as wealth that has not been annuitised and that can be assumed (at least in large part) to be saved for bequests. However, this approach would be erroneous for two reasons. First, the stock of wealth represents command over resources that a pensioner *could* spend if she or he so wanted. Secondly, if bequests are altruistic, then presumably elderly donors derive some utility from the knowledge that their pet charity or relative will benefit after they have passed on. If bequests are strategic, then pensioners enjoy some non-pecuniary return.[72]

This analysis therefore invites a definition of income that asks: how much can people safely spend in a period and expect to have net wealth of zero when they die? The easiest way of maximising available resources per period while ensuring final net wealth is zero is, of course, to buy an annuity. This gives a comprehensive measure of command over resources, which is defined as the sum of non-capital income plus initial period wealth times the annuity rate. This approach has many of the advantages of measures of living standards using expenditure (see Section 1.2). In particular, it is consistent with the lifecycle model of consumption. The annuitisation of wealth should not, however, be seen as a recommendation of an appropriate financial strategy for the elderly. Rather, it is a way of

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[70] Modigliani and Brumberg (1955) and Yaari (1965).

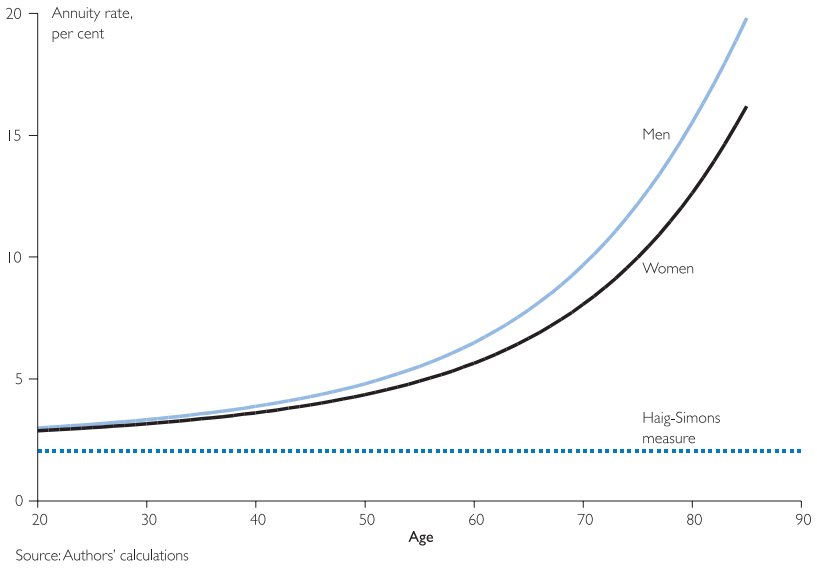
[71] For example, Bernheim, Shleifer and Summers (1985).

[72] An alternative argument builds on a precautionary motive for the elderly to hold stocks of wealth. If insurance markets are imperfect, then pensioners may need to self-insure against potential health-care and long-term care costs. The result is that many pensioners, who are fortunate enough to avoid the need for expensive care, will leave bequests. Again, however, it is difficult to argue that a pensioner with a large stock of wealth held against such needs is only as well off as one with no savings.

combining flows of incomes (state and private pensions) and stocks of wealth into a single measure of command over resources.

The main implication of this approach is that the measure of command over resources derived from wealth increases with age. Figure 9.1 shows the annuity rate calculated using standard actuarial techniques on the latest population life table for the United Kingdom. For an older worker - say, age 50 - the annuity rate is around 4.5 per cent (averaging between the sexes). For a pensioner of 70, the annuity rate is double that: nine per cent. Assume for a moment that both age groups earn the same investment return on their wealth.[73] The standard measure would say that the command over resources derived from this capital was equal. This measure of command over resources would say that pensioners, with a shorter life expectancy, could afford to run down their capital more quickly, and so their command over resources is larger.

Figure 9.1 Annuity rates by age and sex



Source: Authors' calculations

A second, related implication is that the value of the command over resources deriving from stocks of wealth increases at all ages compared with the standard statistical measure, which includes only income from capital. The chart assumes an interest rate of two per cent.[74] The Haig-Simons definition says that this return is what people can spend, leaving capital intact, shown by the dotted line. Taking account of the ability to draw down capital as well as spend interest increases command over resources even for the very youngest.

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[73] Prudent investors would probably shift their portfolio to less risky assets as they get older: see, *inter alia*, Jagannathan and Kotcherlakota (1996), Samuelson (1989) and King and Dicks-Mireaux (1982). Thus, older investors would earn a lower rate of return than younger investors.

[74] Annuity rates are calculated using the riskless interest rate (*e.g.*, that on long-term government bonds) because they deliver a certain stream of payments. Even if people's wealth is held in higher-risk, higher-return assets, it is reasonable to compare the return on an annuity with the riskless interest that would be earned on the fund. Note that the pattern of the result would be the same at different interest rates.

The implications of this treatment of capital income are complex because wealth holdings vary with characteristics that are important for the purposes of our study, such as age and income. Table 9.1 gives a tentative flavour of its impact. The first column shows mean net financial wealth in the United Kingdom by age band. The data exclude pension wealth (in occupational schemes)[75] and holdings of real assets, such as housing. Financial wealth increases with age until it peaks for the age band 60-69. The second column simply assumes that capital income is two per cent of the value of wealth. The third column shows the annuity value of wealth calculated as described previously.

Table 9.1 Wealth, illustrative capital income and annuity values by age band, United Kingdom

Age	Mean wealth	Capital income	Annuity value
22-29	862	17	27
30-39	2 613	52	90
40-49	5 283	106	215
50-59	10 102	202	521
60-69	13 059	261	936
70 and over	8 473	169	927

Source: authors' calculations based on National Opinion Polls' Financial Research Survey 1997-98 as reported in Banks and Tanner (1999), Table 5.5

The effect of using the annuity measure is twofold. First, there is a general increase in measured command over resources for all people who hold wealth because we allow for the run-down of the capital as well as the expenditure of the income. Since wealth increases with age, the effect is to increase the measured living standards of the elderly more than those of younger people. Secondly, there is the age-specific effect. This again boosts pensioners' command over resources more than it does workers' because of the decline in life expectancy with age.

We have not yet explored the detailed implications of such an approach on the measured relative living standards of the elderly, which would require analysis of a comprehensive dataset covering income and assets. However, some rough calculations can give an indication of the potential effect. According to the Department of Social Security's Pensioner's Incomes Series, investment incomes make up 14 per cent of pensioners' incomes on average. Assuming that this represents a five per cent return on assets, then the annuity value of wealth would increase measured

[75] Pension rights during the 'accumulation' phase - when the worker is building up pension rights - are obviously an asset of worth to the occupational scheme member. However, it does not seem sensible to include their annuitised value in current income because scheme rules and tax legislation prevents the withdrawal of funds before pension age. (Also, it is not possible to borrow against occupational pension assets formally, *i.e.*, to use them as collateral.)

command over resources of the elderly by five per cent.[76]

Table 9.2 explores the implications of using a comprehensive measure of command over resources for a number of countries using the data on financial assets from Disney, Mira d'Ercole and Scherer (1998). Wealth is shown as a ratio to income in the first four columns, split by marital status and between pensioners and older workers. Among the pensioner units, the wealth-to-income ratio is the highest in Australia: single pensioners have assets worth over six times their income, couples, five times. The average across all the countries shown is around 2.5 for both single pensioners and couples, with Japan and the United States also showing high levels of wealth relative to income. The United Kingdom ranks sixth.

The final two columns indicate the effect of including the annuity value of wealth in income.[77] This is again based on an arbitrary five per cent return on assets. The increase from taking a more comprehensive view of command over resources is thus 2.8 per cent: the annuity rate at age 67 (7.8 per cent) less the return on assets already counted as income (five per cent).

The average difference would be a seven per cent increase in pensioners' incomes, with significant variation between countries. For example, countries such as Australia and the United States tend to have relatively low pension replacement rates. However, a broader concept of command over resources would put them closer to the position in other countries. Indeed, Australia is an excellent illustration of the benefits of this approach. Partly because of fiscal incentives and partly for historical and cultural reasons, most occupational pensions in Australia are drawn as lump sums rather than an annuity (known as an 'income stream' in Australia).[78] The result is that Australia has one of the lowest pensioner replacement rates on the standard measure of income, but has the highest holdings of wealth. Australian pensioners clearly must finance their consumption by running down their assets: a form of self-provision of an annuity. Compare

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[76] The investment income measure currently includes annuity incomes. It would obviously be sensible to include annuity income in regular income and calculate wealth from all non-annuitised sources of capital income. According to Department of Social Security (2000*b*), annuity income bought from an occupational pension (presumably either from the lump sum or from the accumulation in a defined contribution scheme) is under £1 a week on average and mean income from personal pensions, £3. Investment income excluding annuities is around 12.5 per cent of total income rather than 14 per cent (before this adjustment). The increase in pensioners' command over resources by using this broader measure would be 4.5 per cent.

[77] Note also that these calculations account for the age distribution of pensioners in deriving the mean annuity rate but do not adjust for differential holdings of assets by age. The annuity rates are based on the United Kingdom life table, but the difference in mortality patterns between the different countries are not particularly large.

[78] See Doyle and Piggott (2001) and Bateman and Piggott (2001).

this with another country, the United Kingdom, say, where most occupational-pension benefits are taken as an annuity. Measured income would be higher and asset holdings lower on standard measures even if the economic position were the same. The measure of comprehensive command over resources equalises the treatment of these two different systems of pension provision.

Table 9.2 Financial wealth as a proportion of income and effect on income from annuitisation

	Financial wealth to income ratio				Increase in income	
	Age 55 Single	Age 55 couple	Age 67 single	Age 67 couple	Age 67 single	Age 67 Couple
Australia	2.2	2.1	6.2	5	18%	14%
France	1.9	1.5	2.1	3.7	6%	10%
Germany	0.7	0.5	1.2	1.2	3%	3%
Italy	1.8	1.3	2.8	2.8	8%	8%
Japan	2.8	1.7	4.0	3.8	11%	11%
Netherlands	0.4	0.4	1.0	0.9	3%	3%
Sweden	-0.1	-0.1	1.1	0.7	3%	2%
United Kingdom	0.9	0.7	1.4	1.3	4%	4%
United States	2	1.5	3.5	3.2	10%	9%

Source: Disney, Mira d'Ercole and Scherer (1998), Table 9

Note: the data are from between 1992 and 1995, with the exceptions of the United Kingdom (1988-89) and the Netherlands (1990)

This section has explored some important limitations of the treatment of capital income and wealth in standard measures of living standards. We have argued for a more comprehensive view of command over resources, which acknowledges the ability of the elderly (and indeed others) to finance consumption from accumulated capital as well as from the income earned on that capital. This approach was developed in the North American literature and has been proposed by the Australian Bureau of Statistics (1995).[79] However, we are only aware of one recent implementation: Crystal and Shea (1990). Their results suggest that adjusting for under-reporting of investment income would increase the mean replacement rate for the elderly in the United States from 94 to 103 per cent. Allowing for the annuity value of wealth then increases the measured replacement rate from 103 to 124 per cent.

The Canberra group of international experts on income distribution statistics considered this approach. Everaers, van der Laan and McDonald (2000), for example, argued that 'Economic well-being is determined by a household's access to goods and services…[and] is also affected by saving for future consumption and by the value of wealth holdings that offers opportunities for increased consumption in the future by running down

[79] Examples of this approach in North America include Murray (1964), Weisbrod and Hansen (1968), Moon (1977) and Danziger *et al*. (1984*a*,*b*).

assets. Income presents a partial view of economic well-being…' The authors discuss the Australian Bureau of Statistics (1995) proposal and note that there are methodological issues that need to be resolved before such an approach might be implemented. These are the type of annuity (for example, covering an individual life or both partners in a married couple) and the interest rate that is assumed.

9.2 Housing

The previous section looked in detail at the treatment of financial wealth. Many pensioners, however, have a far more valuable asset in the shape of their own home. Indeed, for many older households, housing wealth is the major asset other than social-security or private-pension wealth. Two recent studies in the United Kingdom estimate the median equity value of home-owning pensioners at just over £70,000 in the late 1990s.[80] Similarly, the Council of Mortgage Lenders has estimated that homeowners aged 60 and over had £367 billion in unmortgaged equity in 1986, averaging around £72,500 per dwelling.[81] However, home ownership rates decline with age (although this is partly a cohort rather than a pure age effect) and increase with income. This makes housing wealth a particularly important component of assets for younger, richer, pensioners.[82] Thus, fluctuations in house prices can have very large implications for the wealth of such households.[83] Housing also affects living standards through the cost of maintenance and repairs.

If this is an important issue in the United Kingdom, what of other countries? Table 9.3 provides some details on the extent of home ownership across a number of countries.[84]

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[80] Hancock (1998*a*,*b*) - based on Family Expenditure Survey data - and Disney, Johnson and Stears (1998) - using Retirement Survey data.

[81] See Forrest and Leather (1997) and Council of Mortgage Lenders (1998).

[82] According to Disney, Johnson and Stears (1998), 64 per cent of respondents to the Retirement Survey who survived from 1988-89 to 1994 were owner occupiers at the end of the period. The ownership rate was much lower among those who died between those years. Hancock (1998*b*) shows that the owner occupation rate varies from 24 per cent in the lowest income quintile of 65-74 year olds, through to 95 per cent in the top quintile (in the early 1990s). Among heads of households aged 75 or over, owner occupation rates are slightly lower, especially in the third quintile.

[83] Disney, Henley and Stears (2000).

[84] See Whitten and Kailis (1999) for an analysis of housing tenure of the elderly in EU member states.

Table 9.3 Pensioners' housing tenure by income quintile in eight countries

	Bottom quintile			Middle quintile			Top quintile		
	Rent	Mortgage	Own	Rent	Mortgage	Own	Rent	Mortgage	Own
Australia	20	2	78	21	4	75	13	6	81
Canada	42	9	50	23	10	66	21	8	71
France	34	3	62	38	5	57	21	7	72
Germany	63	5	32	64	7	29	37	21	42
Italy	35	4	62	36	3	61	34	3	63
Netherlands	57	11	33	81	7	12	47	26	26
United Kingdom	46	4	50	47	5	48	10	15	75
United States	30	70		15	85		10	90	

Note: 'own' means owned outright except in the United States where it is not possible to separate people who own their home outright from people with a mortgage

Source: Johnson (1998); authors' tabulations of British Household Panel Survey

Owner-occupation rates are extremely high in Australia and the United States and comparable with the United Kingdom in Canada. Elsewhere in Europe, owner-occupation rates are significantly lower, especially in the Netherlands. In addition, many home-owners still have a mortgage on their property in Germany and the Netherlands. To the extent that housing wealth represents an additional implicit annuity stream, pensioners in the Anglo-Saxon countries are better off than income-based calculations would imply. As Table 9.4 shows, housing tenure has changed significantly over time in the United Kingdom. The treatment of housing will also therefore have an effect on time series comparisons.

Table 9.4 Pensioners' housing tenure in the United Kingdom, 1961-62 to 1991-92

per cent	1961-62	1971-72	1981-82	1991-92
Owner occupier	44	43	57	60
Social rented	22	44	42	32
Private rented	34	34	11	8

Source: Johnson et al. (1996), Table 3.6

Owner occupation yields a flow of services that should, in principle, be treated as an income flow, usually called an 'imputed rent'. The 'asset-rich, income-poor' phenomenon seems particularly pertinent with housing wealth, especially in countries such as Australia where the tax (and means-test) treatment of retirement-income streams invites individuals to hold their assets in the form of housing.[85] Nevertheless, there are difficulties in simply interpreting home ownership in this manner: housing is both an investment and a consumption good. The phenomenon of asset-rich, income-poor households has also led to concerns as to the affordability of home ownership for pensioners. This applies especially to widowed or single pensioners who continue to live in houses with substantial

[85] See Creedy and Disney (1989, 1990) for an analysis of these incentives.

maintenance burdens that are hard to afford from current income and financial wealth.[86] But pensioners are often reluctant to move from their family home[87] so that housing wealth proves a constraint on current living standards rather than simply a source of additional imputed income.

There are a number of different issues here that need to be disentangled. The first is to determine what is the annuity value of this housing wealth, and how its use would affect the incomes of pensioners and the poverty rates among pensioner households. Hancock (1998b) provides an illuminating account of this in the United Kingdom. However, converting housing equity into an annuity implies the existence of a competitive and secure equity-release sector.[88] But this market has remained rather thin in the United Kingdom arising, it may be suspected, from loading charges in part associated with the adverse-selection problems intrinsic to such a market.

The second strategy, therefore, for releasing equity is through 'downsizing' of accommodation, either by moving to a smaller owned house, or even into the rented sector. What is the extent of this phenomenon, how much equity is typically released, and for what is it used? We consider the evidence briefly.

Hancock (1998*b*) uses the Family Expenditure Survey to calculate the annuity streams that could be generated from the housing wealth of pensioner households. She then examines what fraction of pensioner households would gain from such a strategy - that is, where the net annuity stream generated is above a certain threshold (£130 a year) - how these gains would affect measured incomes and, in particular, poverty rates among pensioner households. Her calculations suggest that the proportion of pensioners (home-owning pensioners) that would gain rises with age: from 18 per cent (28 per cent) of single men aged 65 or over, to 28 per cent (45 per cent) of single men aged 70 or over and to 44 per cent (75 per cent) of single men aged 75 or over. This is because the annuity rate increases with age (Figure 9.1) while the amount deducted to pay the interest on the underlying mortgage is constant. Single women who are homeowners gain disproportionately, and couples also gain because of their high incomes. Table 9.5 illustrates her results. It shows the proportion of each group that would gain by income quintile and their average gain. Richer pensioners obviously would benefit more, both because they are more likely to be home-owners and because they tend to live in more valuable homes.

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[86] See Feinstein and McFadden (1989) and Disney, Gallagher and Henley (1994).

[87] Venti and Wise (1990); Megbolugbe, Sa-Aadu and Shilling (1999).

[88] Equity-release policies are often called 'home-income plans' in the United Kingdom. In addition to Hancock's work (1998a,*b*), see Jacobs (1996). Case and Schnare (1994), Mayers and Simons (1994) and Merrill *et al*. (1994) discusses equity-release schemes in the United States, where they are often called 'reverse mortgages'.

Table 9.5 Gains from equity release among people aged 65+, by income

	Lowest quintile	Second quintile	Middle quintile	Fourth quintile	Top quintile	Total
% of all 65+ who gain	8	19	22	26	32	21
% of all 65+ homeowners who gain	39	47	33	30	33	36
% of all 70+ homeowners who gain	-	63	52	50	58	56
median annual gain for all 65+ who gain	-	£910	£810	£860	£1010	£900

Note: median gains in 1997-98 prices

Source: Hancock (1998b), Table 4

Poverty rates among the elderly are also affected by equity release. If the poverty rate is defined relative to mean equivalent net income, then the effect on measured poverty is more dramatic the higher is the relative poverty line. For all pensioner households, there is little discernible effect until the poverty line rises to 65 per cent of the mean, when inclusion of equity wealth would reduce measured poverty by four percentage points (from 38 per cent to 34 per cent). This is obviously because the poorest pensioners are much less likely to be home-owners and, if they are, their homes tend to be less valuable. For households headed by someone aged 75 or over, there is an eight percentage point fall. Among home-owners, and especially the most elderly home-owners, the gains are largest; in the latter case for 75+ aged owners, reducing the measured poverty rate (with a 65 per cent of mean income threshold) from 24 per cent to 8 per cent of owner-occupied households.[89]

The problem with all this is differential mortality, and therefore selection by insurers and self-selection by applicants. A basic reason why the equity release market is so thin is that applicants for schemes will tend to be longer lived, or are assumed to be so by insurers. Thus, pricing of equity-release schemes will contain loading by insurers reflecting adverse selection, as well as administrative costs. Actual financial gains from equity release are likely to be much lower, with a consequent reduced impact on measured income and poverty rates. Plausible empirical evidence of the impact on pensioner incomes of the operation of equity-release schemes in practice is limited precisely by the thinness of the market.

The most effective form of equity release practised by older households is through downsizing and through changes in tenure status. Here there

[89] The Joseph Rowntree Foundation (1998) has looked at equity release as a way of financing home maintenance and improvement for asset-rich, income-poor elderly. The Foundation found that the policy of using equity release to replace improvement grants failed because elderly homeowners were very reluctant to take on debt and because of legal obstacles to housing associations and local authorities giving equity-secured loans.

is some evidence on housing equity released through house moves by elderly households, and on the relation of house moves to housing wealth and income. A number of studies have examined the relationship between house moves and 'excess' housing costs, measured in either physical units - for example, number of rooms per family member - or monetary terms - for example, income-to-housing-wealth ratios.[90] The presumption is that moves are more likely where the house is 'inappropriate' to the size of the family or when there are changes in economic status (such as retirement).

The results of these studies are mixed. Ermisch and Jenkins (1999) find some evidence that retired households who move do physically reduce their living space. Moreover, evidence from the United States is that some households move to rented accommodation after retirement as a way of releasing housing equity for consumption. But in the United Kingdom, more older households switched from rental to owner occupation than made the reverse move in the late 1980s, perhaps because of 'right-to-buy' policies in housing maintained by local authorities. There is some evidence that death of a spouse is particularly associated with a house move[91] and that retirement or the spouse leaving job (but not own retirement) is associated with moving in the United Kingdom.[92] However, Disney, Henley and Stears (2000) find no evidence that 'excess' housing budget shares, relative to income, were associated with household moves in the late 1980s. This was perhaps because this was a period of falling house prices that induced elderly households to 'sit tight'. However, this paper does estimate that moving by elderly households was associated with an increase in financial assets, indicating some evidence of 'equity release' as a motive for moving.

Given the difficulty in finding clear cut relationships between moving behaviour and observable variables such as the household's financial characteristics, it is not surprising that it is hard to pin down relationships between housing equity, financial wealth and household spending. A basic issue is whether changes in the value of housing equity induce households to increase their consumption. Real house prices have generally tended to grow and pensioners typically own their home outright. Thus, choosing an income measure of well-being - if imputed rents from owner-occupation were ignored - would tend to understate the growth in (potential) real living standards during periods of house price increases.[93]

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[90] Feinstein and McFadden (1989) on the United States; Ermisch and Jenkins (1999) and Disney, Henley and Stears (2000) on the United Kingdom,

[91] Megbolugbe, Sa-Aadu and Shilling (1999) on the United States; Ermisch and Jenkins (1999) on the United Kingdom.

[92] Ermisch and Jenkins (1999); Disney, Henley and Stears (2000).

[93] Venti and Wise (1989, 1991).

An interesting finding is that of Engelhardt (1996), who argues that there is an asymmetry in household behaviour between periods of rising and falling house prices. His evidence across states in the United States suggests that, where house prices are rising, there is little change in consumption or saving behaviour of households. By inference, such households do not treat rising housing equity as enhancing their consumption possibilities. This could be either because they intend to bequeath their housing wealth or because they do not perceive housing wealth gains symmetrically with other wealth gains (for example, windfalls in financial assets or current income). However, when there are house price *falls*, these are associated with significant increases in saving in financial assets, perhaps because households are attempting to maintain a minimum level of overall wealth.

Disney, Henley and Stears (2000) add a nuance to this argument. The period covered by the two waves of the Retirement Survey (1988 to 1994) in the United Kingdom saw a significant fall in real house prices, although the decline was very uneven across the country. Thus, the authors can test the impact of house price falls on saving (acquisition of financial assets) for a large sample of elderly households. They argue that, since moving is the major way of releasing equity, the impact of the fall in house prices on financial asset acquisition will be different between movers and non-movers.[94] They indeed find that movers almost completely offset the fall in housing wealth by an increase in financial assets, suggesting that the release of housing equity may have been used to restore target wealth. However, most people did not move, and for these households, there is no significant change in saving behaviour: these households simply took the 'hit' to their wealth stocks arising from the house price fall.

Cross-country comparisons of the value of housing equity (Smeeding et al., 1993; Whiteford and Kennedy, 1995) suffer from two main problems. First, they combine the value of direct subsidies to social rented housing with the value of home-owners' equity. Although both of these relate to housing, they are very different economic issues, as the section below on in-kind incomes will show. Secondly, the data are far from ideal. In most cases, the value of housing equity has to be imputed from a different dataset and matched into the Luxembourg Income Study by age and income. People are then simply assumed to earn a fixed rate of return on the value of housing equity. For these reasons, we have not reported these results.

In summary, housing wealth is an important determinant of the standard of living for many older households: its use, for example, could reduce significantly measured poverty among very elderly households outside the poorest quintile. Nevertheless, the equity-release market is quite

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[94] Although the two decisions, to move and to save, should be and are modelled simultaneously.

thin in the United Kingdom and in other OECD countries. The evidence that pensioner households use house moves to release equity is strong, but many elderly households are reluctant to move at all, even when they have high potential values of housing equity. Large houses (relative to income) are both a blessing and a curse, from the point of view of pensioner well-being.[95]

9.3 Taxation

The standard measure of income takes account of direct taxes (income tax, property taxes *etc*.), but ignores other taxes that might affect people's living standards. The most significant omissions are indirect taxes - which in turn include both general consumption taxes (value-added tax) and excise duties - and employer social security contributions.

A problem arises because countries differ enormously in their tax structures (Table 9.6). Denmark, Australia and New Zealand, for example, collect a particularly large proportion of their revenues from the personal income tax, but do not levy social security contributions on employers or (except for a small charge in Denmark), on employees. In contrast, France, Germany and the Netherlands rely heavily on social security contributions, in the first two cases, mainly paid by employers. Finally, the United States is the only OECD country without a general consumption tax: its state-level sales taxes raise fewer revenues than value-added tax or goods-and-services tax in other countries. (Japan and Switzerland also record small receipts from general consumption taxes because their levies were introduced only recently at a low rate.)

Table 9.6 Structure of taxation in OECD countries (per cent of total revenues from each source)

Personal income		Corporate income		Social security		General consumption	
Denmark	52	Luxembourg	16	France	45	Iceland	32
Australia	41	Japan	15	Germany	39	Turkey	24
New Zealand	45	Australia	13	Netherlands	38	New Zealand	23
Average	29	Average	7	Average	26	Average	17
Portugal	20	Germany	4	Denmark	3	Switzerland	8
France	14	Austria	4	Australia	0	United States	8
Greece	9	Iceland	3	New Zealand	0	Japan	5

Note: the table shows the 'outliers' in each case, i.e., the OECD countries with the three highest and three lowest proportions of total revenues from each source

Source: Whitehouse (1997)

Excluding general consumption taxes from our measure of income would, under certain circumstances, have no effect. First, if in each country the tax were truly general (*i.e*., applied to all goods and services equally), then the tax burden would be the same for all groups. Thus, replacement rates, poverty rates *etc*. would be unaffected. However, all countries

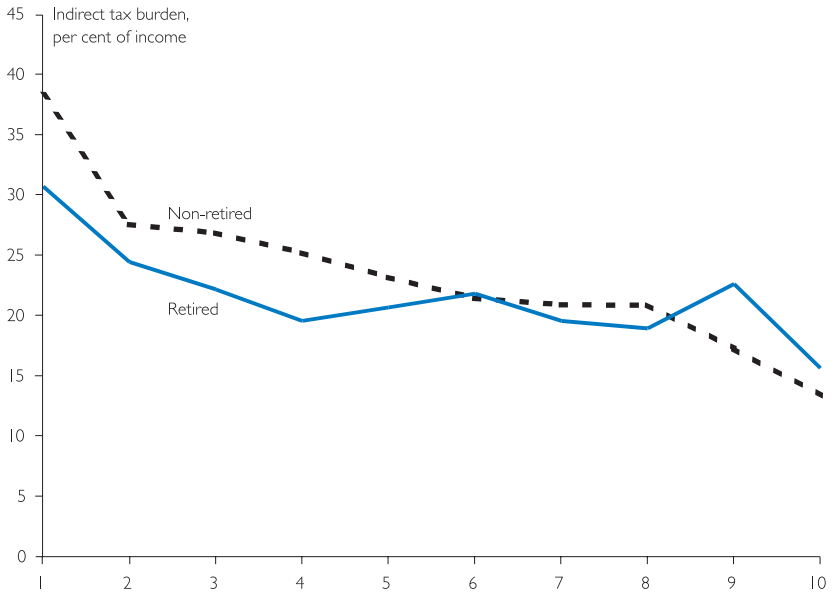
[95] See, for example, the survey of older homeowners' attitudes in Askham *et al*. (1999) and the analysis in Hancock *et al*. (1999).

exempt some goods and services and most tax others at zero or lower rates. Still, if consumption baskets were the same for different groups, then the tax burden would again be the same. But pensioners and people of working age have very different spending patterns, both between goods and services with full versus concessionary general consumption tax rates and across goods subject to excise duties (alcohol, tobacco, petrol *etc*.).

The effect of indirect taxes on pensioners and workers in the United Kingdom is illustrated in Figure 9.2. The chart shows the amount paid in indirect taxes as a proportion of income across the income range. The population has been divided into 'retired' and 'non-retired' households and into deciles of the income distribution in each of these two groups. The burden is overall higher on non-retired households than it is on retired: the means across the deciles are 23.5 and 21.5 per cent respectively. The poorest 80 per cent of retired households generally face a smaller indirect-tax burden than the non-retired.

Since consumption decisions are obviously affected by the level of indirect taxes on different goods and services, these estimates of the indirect tax burden are only a reflection of the actual welfare effect of the tax. People will tend to substitute goods with a lower tax rate for more heavily taxed goods.

Figure 9.2 Indirect tax burden by income decile for retired and non-retired households, United Kingdom, 1997-98



Source: Authors' calculations based on Harris (1999), tables 3A and 4A

For both groups, indirect taxes appear to be regressive: the burden is generally higher for lower income deciles. This is explained by the savings rate at different income levels. Poorer groups tend to dis-save, so their consumption exceeds their income and hence the apparent indirect-tax burden, measured against income, is relatively high. Richer groups tend

to save, with the reverse effect: income exceeds consumption and so a smaller part of income is taxed. This is apparent in the chart both in the decline in the indirect-tax burden with income for both groups, but also in the cross-over of the retired and non-retired households' lines at high income levels. High-income working-age households tend to have high savings rates, while the elderly save rather less of their incomes.

The result that indirect taxes are regressive measured against income is, however, very misleading. Savings are not just another kind of good or service, they are a means to future consumption. When savings are eventually spent, either by their owners or their heirs, they will bear indirect taxes.

Again, however, adjusting for this effect is complicated. One method is to compare indirect taxes paid against consumption rather than income for different groups. This shows that the indirect-tax burden is progressive rather than regressive because zero-and low-rated goods and services (food, domestic fuel *etc*.) make up a larger proportion of the consumption baskets of poorer groups.[96]

The effects of indirect taxes on the measures of the elderly's relative living standards are complex. Ignoring the problem of savings, the data imply that the pensioner replacement rate is increased by two percentage points by accounting for indirect taxes. The increase would be rather larger if we adjusted for the future indirect taxes paid when savings are spent. Secondly, since poorer pensioners bear a lower indirect-tax burden than poorer workers, there will be a reduction in both pensioner poverty rates and pensioner poverty shares. Unfortunately, the data for many other countries would not allow us to calculate the impact of indirect taxes. In contrast, the United Kingdom's Family Expenditure Survey is ideal for this purpose, because it includes detailed data on both income and consumption.[97]

Employer social security contributions are not a problem for our purposes - examining the relative living standards of the elderly - although they have an important effect in studies of tax incidence and redistribution.[98] The international guidelines on income distribution statistics include employers' social security contributions in the market income of the employee. However, these contributions are then deducted to reach the concepts of disposable income used here. The net result is unaffected.

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[96] A simple adjustment would be to apply the indirect-tax burden measured against consumption to the whole of income. This makes the rather strong assumption that future consumption will have the same pattern (across goods and services taxed at different rates) as current spending.

[97] The OECD secretariat's efforts (Adema, 1999; Adema *et al*., 1996) to adjust social expenditure data for differences in indirect-tax regimes suffer from this problem and the authors are forced to rely on aggregate data, which is of little use for our purposes here.

[98] See, for example, Rosenberg (1989) and Rosenberg and Bell (1992).

9.4 Private pension contributions

The issue of workers' contributions to private pension plans is more complex. Contributions to public pension programmes are deducted from the gross incomes of working-age individuals while private pension contributions are treated as any other kind of savings: that is, as part of current income that could be spent. However, the dividing line between public and private pension programmes is often blurred.[99] We use some international examples to illustrate the issues.

Switzerland requires all workers and their employers to make a minimum contribution to a private pension plan. This is clearly little different from a mandatory contribution to a public scheme. A consistent treatment would be to deduct compulsory private pension contributions from workers' incomes in the same way as contributions to public plans are deducted. Since the contribution is mandatory and there is no way that it could be spent, then it should not be treated as part of current income.

The United Kingdom system is more complex. Around three-quarters of employees are contracted out of the State Earnings-Related Pension Scheme, SERPS, into either defined benefit or defined contribution occupational schemes or into personal pension plans.[100] Defined benefit schemes must then offer to pay a minimum benefit while defined contribution plans must receive a minimum contribution. In a personal pension, the employee continues to pay the standard rate of National Insurance and shortly after the end of the fiscal year, the government then transfers the compulsory minimum contribution to the individual's personal pension provider. Thus, personal pension contributions are treated in the same way as a contribution to SERPS. In contrast, in a defined contribution occupational pension, employers and employees pay a reduced rate of National Insurance but must pay the difference into the occupational plan. This is the parallel of the Swiss case. The employee's net income is over-estimated: although the National Insurance contribution is lower, this money is not available for current consumption. A consistent treatment - with both personal pension contributions and SERPS - would be to exclude these contributions from current income.

The defined benefit case is more complicated. Again, employers and employees pay a reduced rate of social security contributions when the scheme is contracted out. The scheme is then obliged to pay a minimum level of benefit, which is financed by employer and (usually) employee contributions. Until the Pensions Act 1995, the minimum benefit was the 'guaranteed minimum pension', which was broadly equal to (but normally a little less than[101]) the SERPS benefit foregone as a result of

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[99] The OECD - Adema and Einerhand (1998) - has documented the growing role of private social benefits, particularly in the area of pensions.

[100] See Disney and Whitehouse (1992*a*,*b*) and Whitehouse (1998) for a detailed discussion of contracting out.

[101] See Dilnot *et al.* (1994) for an explanation.

contracting out. The government set the contracted out rebate on the advice of the Government Actuary at a level that would, under reasonable assumptions, finance the guaranteed minimum pension. Under this system, consistency would require the contracted out rebate to be treated as a compulsory contribution to a private pension.

It is more difficult to determine a suitable approach under the new contracting out regime. The benefits test for contracting out is no longer linked to the level of the contracted out rebate. For most workers, the minimum benefit from an occupational pension scheme will be more than the contracted out rebate would finance. Simply deducting the value of the rebate of employee contributions from workers' incomes would understate the degree of mandatory pension provision. It would be possible to calculate the contribution required to pay for the minimum benefit using standard actuarial techniques. The result, however, would be sensitive to a range of assumptions. In addition, many schemes pay more than the minimum benefit, so it would be difficult to allocate the cost between employer and employee contributions. Perhaps the safest approach, therefore, would be to deduct the contracted out rebate from workers' incomes accepting that this is an under-estimate of the total cost (and may be an under-estimate of the cost to the employee) of meeting the mandatory benefit requirement.

Japan also has a system of contracting out of its public earnings-related scheme. About a fifth of employees are members of an Employees' Pension Fund. These plans can contract out if they pay a benefit at least 30 per cent larger than that which would have been received from the state scheme. In return, social security contributions are rebated at a rate that varies between 3.2 and 3.8 per cent (depending on the soundness of the scheme's finances), averaging 3.5 per cent.

In the United Kingdom, employers have been unable to force employees to join their occupational pension schemes since 1988. However, in other countries with a large defined benefit occupational sector - such as Canada and the United States - employers can make membership of the pension plan a compulsory part of the employment contract. The United Nations guidelines on income-distribution statistics recommend that the employee contributions to occupational plans be deducted from incomes where the employer mandates membership. The rationale is similar to that for pension contributions mandated by the government: the contribution is not available for the worker to spend currently and so should not form part of net income.

Denmark, the Netherlands and Sweden provide the final example. The government does not generally require employees to contribute to private pensions, but workers covered by collective agreements have to contribute to occupational schemes. Since these cover around 80 to 90 per cent of employees, these programmes are best described as quasi-mandatory.

Again, contributions should be deducted from incomes to ensure consistency with countries with mandatory, public pension programmes.

Unfortunately, data limitations prevent us from exploring this issue empirically. However, coverage of mandatory or quasi-mandatory private pensions in Denmark, Finland, Japan, the Netherlands, Sweden, Switzerland and the United Kingdom is broad. In some cases, it appears that these contributions are already deducted from workers' incomes. In others, the average net incomes of the working age population would be reduced if contributions to these plans were treated consistently with public schemes. A rough back-of-the-envelope calculation for the United Kingdom, for example, would be a reduction in workers' net incomes of between two and four per cent. This would increase pensioner income replacement rates by between one and three percentage points. Such a change would be sufficient to move the United Kingdom up the rankings of replacement rates by up to three positions (depending on the study).

9.5 In-kind incomes

The standard measure of income is generally based on cash income and what is often termed 'near-cash' income. Examples of the latter include food stamps in the United States and housing benefit - paid directly to the landlord - in the United Kingdom. However, the line between what counts as 'near-cash' income and other free or subsidised goods and services is a fine one. And the implications for measures of living standards can be profound.

We take housing as an illustration since the issues are familiar to analysts of income distribution in the United Kingdom. During the 1980s, the United Kingdom government reduced direct subsidies to social housing, so-called 'bricks-and-mortar' subsidies. The burden of financing housing for low-income groups then shifted to the housing-benefit budget. Since the value of subsidised housing is excluded from the standard measure of income but housing benefit is included, a family living in social housing would record a rise in income even if its circumstances were unchanged. The effect on income distribution was shown to be large. Official statistics in the United Kingdom get round the problem by showing incomes before and after housing costs.[102] Nevertheless, a parallel problem occurs in cross-country comparisons because of differences in housing policy. Housing benefit counts as income in the United Kingdom but the value of subsidised housing in, say, the Netherlands and the Nordic countries, does not.

Two other public programmes involve significant government expenditure. Health and education are often the largest budgets after cash transfers (social security). The benefits of these two programmes are also distributed unevenly - both by age group and by income range - suggesting a large potential impact on measures of income distribution.

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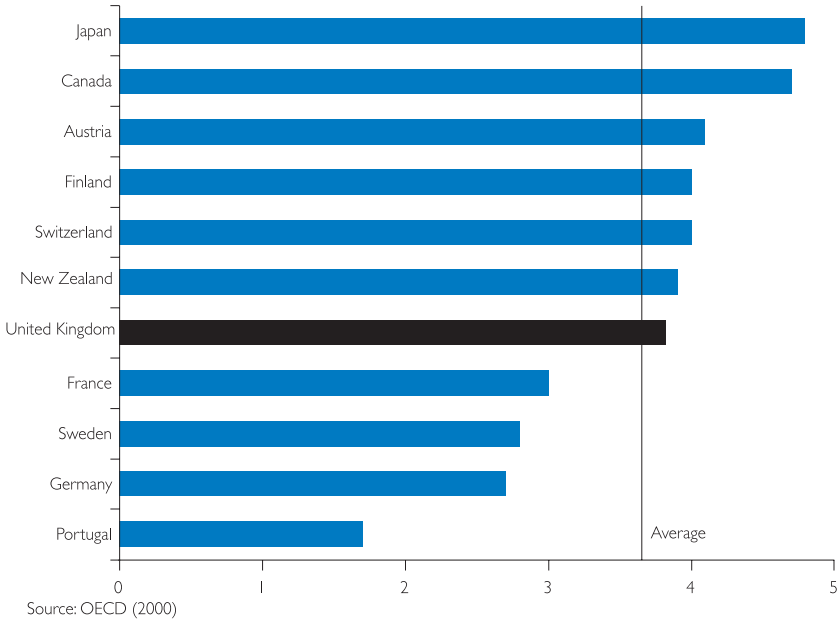
[102] See Johnson and Webb (1992).

Since the scope of such programmes also varies between countries, there might also be an impact on cross-country measures. The measures of cash incomes shown above essentially take account of the cost of public services (by deducting taxes from gross incomes) but not the benefit the public enjoys.

Figure 9.3 illustrates how health care expenditure on the elderly is generally higher than health care expenditure on the rest of the population. It also shows that this ratio varies substantially across countries. Insofar as health care expenditures are publicly provided, ignoring in-kind benefits will bias downwards the relative incomes of the elderly, and may also change the ranking of countries.

There have been three international studies of the impact of benefits in kind on the income distribution, although all are closely related and all build on Luxembourg Income Study data.[103] There are many uncertainties in these estimates. They also invoke many strong assumptions. These include the absence of externalities (so all the benefits accrue to the direct recipient) and that all the value of the benefit to the recipient is equal to the cost of providing the benefit incurred by the government.[104]

Figure 9.3 Ratio of health care expenditure on population aged 65+ to expenditure on people aged 0-64, 11 OECD countries, 1993



Source: OECD (2000)

103 Gardiner *et al.* (1995) and Radner (1997) are two other international studies. See also Evandrou *et al.* (1992, 1993) and Harris (1999) on the United Kingdom.

104 Wolfe and Moffitt (1991) and United States Bureau of the Census (1982, 1995) attempt to calculate a measure of the value of the benefit to households rather than looking at the cost of providing it.

Table 9.7 shows the value of health and education spending as a percentage of cash income. The size of the figures is striking: these in-kind benefits cost as much as a quarter of the value of cash incomes to provide. The cost of benefits for the elderly is generally higher than the population as a whole, with the exception of Germany, where the total figures are about the same. On average, benefits for the elderly cost 25 per cent of cash income compared with 18 per cent for the population as a whole. The structure of benefits, however, differs. The elderly are rarely beneficiaries of education spending, which makes up nearly half of the total cost of these services for the population as a whole.

Table 9.7 Public spending on health and education as a percentage of household cash income

	Population			Elderly	
	Health	Education	Total	Health	Total
United Kingdom	8.9	8.7	17.6	20.8	21.3
Germany	10.2	4.1	14.3	13.9	14.1
Netherlands	13.2	9.7	22.9	32.1	32.2
Sweden	13.4	11.8	25.2	43.7	43.7
Australia	9.0	7.3	16.3	20.4	21.1
Canada	8.7	10.9	19.6	26.9	27.9
United States	7.0	9.3	16.3	15.0	16.1

Source: Whiteford and Kennedy (1995), Tables 5.1 and 5.2

Including in-kind benefits is therefore likely to affect the value of the standard measures of the relative living standards of the elderly. We begin with the replacement rate (Table 9.8). As would be expected from Table 9.7 above, the result is typically a small increase in replacement rates once benefits-in-kind are taken into account. The main exception is Sweden, where the very large expenditures on healthcare for the elderly result in a sizeable increase in the measured replacement rate. Although the pattern of results is broadly similar - because the estimates are based on similar data and methodology - the level of the replacement rate varies significantly because of large differences in the measure of cash income.

Table 9.8 Replacement rates of the elderly for cash incomes and for cash incomes plus the cost of providing education and health

	Smeeding et al.				Whiteford and Kennedy		Steckmest			
	Single		Couple		All		Single		Couple	
	before	after	before	after	before	after	before	after	before	after
Australia	37	39	66	68	73	76				
Canada	42	47	80	84	88	96				
Germany	50	48	87	86	98	97				
Netherlands	56	56	82	84	102	110				
Norway							76	78	90	90
Sweden	56	69	100	111	84	97	78	83	95	97
United Kingdom	31	33	58	57	84	87	80	82	83	84
United States	41	43	87	86	97	97	43	42		

Source: Smeeding et al. (1993), Table 3; Whiteford and Kennedy (1995), Tables 5.1 and 5.2; Steckmest (1996), Table 4.2

The effect of measuring in-kind benefits on poverty rates is more complex because the benefits of publicly provided services can be distributed differently across different income groups. Table 9.9 shows the results from two studies, where poverty is defined as an income below half the average. Including benefits in kind reduces measured poverty rates in every case. Indeed, in some countries this virtually eliminates measured pensioner poverty. Again, poverty rates for cash incomes differ substantially between the two studies (see Chapter 4 for a discussion). There are few re-rankings after in-kind benefits are taken into account. The only exception is the United Kingdom, where measured poverty rates improve relative to other countries once the benefits of health and education spending are included.

Table 9.9 Elderly poverty rates based on cash incomes and cash incomes plus the cost of providing education and health

	Smeeding et al.				Whiteford and Kennedy					
	Single		Couple		Single		Couples		All	
	before	after	before	after	before	after	before	after	before	after
Australia	46.1	8.2	7.7	4.9	8.2	1.7	2.0	0.5	4.9	1.1
Canada	41.8	9.4	8.9	1.3	39.4	8.2	23.6	5.0	30.0	6.8
Germany	18.1	14.6	8.8	4.4	11.5	6.5	10.2	3.7	10.9	5.1
Netherlands	4.9	4.9	1.4	1.0	3.5	1.6	2.7	1.3	3.0	1.5
Sweden	1.1	0.0	0.3	0.3	14.8	6.8	8.6	3.1	11.3	4.6
United Kingdom	50.3	18.6	23.5	1.1	6.8	2.9	9.2	2.6	8.1	2.7
United States	45.2	33.9	17	8.9	34	22	17.4	11.3	25.3	16.4

Source: Smeeding et al. (1993); Whiteford and Kennedy (1995), Table 5.5

10 CONCLUSIONS

This report has surveyed the results of a dozen recent papers on the relative living standards of the elderly in the United Kingdom and in 18 comparable OECD countries.[105] Cross-national analysis of income distributions is a relatively recent research topic. Over half of the papers examined focus on the income distribution as a whole, with the position of the elderly emerging only as a by-product of the study of economy-wide patterns of inequality.

It is very easy to draw simplistic policy conclusions from any analysis based on cross-section data. It is also easy to get lost in the detailed methodological questions that we have covered.

The cross-country comparisons that we have presented suggest that pensioners in the United Kingdom do about as well on average - relative to society as whole - as their counterparts do in comparable OECD countries (in Europe, North America and Australasia). In the latest study for the OECD secretariat, for example, pensioner incomes adjusted for household size are 78 per cent of the incomes of the whole population. This is a little below the average for all 15 countries (83 per cent). The proportion of British pensioners in poverty - defined here as having an income below half the average - is 12 per cent, just below the international average of 14 per cent. Detailed comparisons show that the distribution of incomes among pensioners in the United Kingdom is relatively compressed, even when compared with continental European economies that have rather narrow income and earnings distributions overall.

However, the results of different studies can give very different answers, sometimes even when they are based on the same dataset. Some of the variation can be explained by methodology, by the time period and by the countries covered. There is a definite trend for the position of British pensioners to look better in more recent studies. This is also confirmed by national data sources - particularly the Department of Social Security's Pensioners' Incomes Series - which show rapid growth in pensioners' incomes over the last two decades. It is important to bear in mind that even these most recent data are unfortunately only from 1995: recent policy changes, in the United Kingdom and elsewhere, will not therefore be reflected in the results.

One of the principal reasons for this improvement over time is the maturing of the pension system. New retirees have much larger

[105] Note that we have excluded the 'new' members of the OECD, which have rather lower GDP per head, such as the Czech Republic, Hungary, Mexico, and Poland.

occupational pension and SERPS entitlements than older pensioners do. This is because improved protection of occupational pension rights of early leavers and the introduction of SERPS in 1978 are only now fully feeding through to retirement benefits.

10.1 Future developments

Existing studies have painted a conflicting picture of pensioner incomes across countries. It is probably impossible to give a definitive answer to the question posed at the beginning of the report: 'how do British pensioners fare relative to their counterparts overseas?' Nonetheless, our analysis has pointed to a number of gaps in our knowledge and ways in which this work could usefully be developed.

First, there are potential studies that would complement the distributional analyses surveyed here. For example, simulation of future pension rights for different illustrative individuals would control for the different levels of maturity in the pension system and give some indication of the benefits that today's workers are likely to enjoy. Given the long lead times involved in pension policy between enactment and outcome, it is important to know what rights today's workers are building up as well as the rights that today's pensioners earned. The United Kingdom's recent reforms, for example, have increased state pension rights for many lower-income workers through the substitution of the state second pension for SERPS. Other countries, in contrast, have cut pension entitlements to curtail the growing pension burden arising from the ageing of the population.

Secondly, exploiting new datasets that are becoming available. The European Community Household Panel (ECHP) offers data collected on a comparable basis for a range of EU countries. Although the income data in the ECHP surveys are limited, this dataset would complement existing cross-national studies. These have followed two approaches. The Luxembourg Income Study aims to transform national datasets onto a comparable basis. Other papers (such as Johnson and the more recent OECD studies) have issued detailed terms of reference to national experts. This latter approach has the advantages that the researchers are familiar with the data and with institutional details, such as the workings of the tax and benefit system. The ECHP is designed to be comparable across countries from the start, avoiding many of the problems of the Luxembourg Income Study database.

Furthermore, there has been little effort thus far to exploit the panel aspect of the ECHP dataset, which would allow one to look at actual replacement rates as people move from work to retirement. The OECD secretariat has also collected a series of national panel datasets - including data from Canada, Germany, the Netherlands the United Kingdom and the United States. It might be possible to use this source along with the European panel to examine the change in incomes over the transition into retirement.

Thirdly, recent work has taken a broader view of the resources available in retirement. Disney, Mira d'Ercole and Scherer (1998), for example, look at the financial and real assets owned by the elderly. This report has described a broader measure of command over resources. It would be useful to implement this measure for a range of countries to show the effect of financial assets on the living standards of the elderly. There are, however, important methodological questions that need to be investigated first, but these are not intractable. The related issues of measuring housing equity and how housing wealth can be incorporated into an economic income measure are also worthy of further study.

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APPENDIX A DATA APPENDIX

A.1 Disney, Mira d'Ercole and Scherer (1998)

This study compares the income and wealth of recently retired (those where the head is aged circa 65-69) with people immediately before pension age (household heads aged circa 55-59). It was prepared by the OECD based on a draft by Disney, which drew on analyses of national data sources by a series of experts. Table A.1 shows the datasets used, Table A.2 lists the contributors.

The datasets include all households in the specified age range except Germany, Japan and Sweden, which exclude people living with their descendants. In France and the United Kingdom, the first survey is used for income information, the second for data on assets. The two named surveys in the United States are used for the different age ranges.

Börsch-Supan's (1998) study is based on a provisional version of the same dataset.

Table A.1 Datasets used in Disney, Mira d'Ercole and Scherer, 1998

	Survey	Years	Sample	Age groups
Australia	Household Expenditure Survey	1993-94	1 094	55-59
				65-69
France	Budget de Famille	1994-95	1 412	55-57
	Actif Financiers	1992	1 587	65-69
Germany	Income and Expenditure Survey	1993	5 185	53-57
				65-67
Italy	Survey of Household Income and Wealth	1995	3 632	50-60
				62-72
Japan	National Survey of Family Income and Expenditure	1994	3 975	53-57
				65-69
Netherlands	Socio-Economic Panel	1990	993	51-59
				65-73
Sweden	Income Distribution Survey	1995	2 119	52-57
				66-69
United Kingdom	Family Expenditure Survey	1988-89	2 471	55-59
	Retirement Survey	1988-89	1 383	65-69
United States	Health and Retirement Survey	1992	2 206	51-61
	Asset and Health Dynamics of the Oldest Old	1993	2 153	70-79

Table A.2 List of contributors to Disney, Mira d'Ercole and Scherer, 1998

	Contributor	Institution
Australia	Hans Baekgaard	National Centre for Social and Economic Modelling (NATSEM), University of Canberra
France	François Guillaumat-Taillet	Institut National de la Statistique et des Etudes Economiques (INSEE)
Germany	Axel Börsch-Supan, Annette Reil-Held	University of Mannheim
Italy	Rosaria Marino	Bank of Italy
Japan	Noriyuki Takayama	Hitotsubashi University
Netherlands	Rob Alessie	Tilburg University
Sweden	Kjell Jansson	Statistics Sweden
United Kingdom	Richard Disney	University of Nottingham/Axia Economics
United States	Jim Smith	Rand Organization

A.2 Johnson (1998, 1999)

These papers draw on a series of papers prepared by national experts and presented at a conference at the Institute for Fiscal Studies, London in March 1998. More detailed results will be published in Disney and Johnson (forthcoming). Table A.3 lists the national contributors. Table A.4 shows the data sources used.

Table A.3 List of contributors to Johnson (1998, 1999)

	Contributor	Institution
Australia	Anthony King	National Centre for Social and
	Hans Baekgaard	Economic Modelling, University of
	Ann Harding	Canberra
Canada	Bev Dahlby	University of Alberta
	Michael Hoffman	
France	Louis-Paul Pele	Institut National de la Statistique et des
	Nadine Legendre	Etudes Economiques (INSEE)
Germany	Axel Börsch-Supan	University of Mannheim
	Annette Reil-Held	
	Reinhold Schnabel	
Italy	Agar Brugiavini	University of Venice
	Elsa Fornero	University of Turin
Japan	Noriyuki Takayama	Hitotsubashi University
Netherlands	Klaas de Vos	Tilburg University
	Arie Kapteyn	
New Zealand	Susan StJohn	University of Auckland
United Kingdom	Carl Emmerson	Institute for Fiscal Studies
	Paul Johnson	
United States	Alain Jousten	Massachusetts Institute of Technology

Table A.4 Datasets used in Johnson (1998, 1999)

	Survey	Year(s)
Australia	Survey of Income and Housing Costs	1995-96
Canada	Survey of Consumer Finances	1995
France	Family Budget Survey	1995
Germany	Income and Expenditure Survey	1993
Italy	Bank of Italy Survey of Household Income and Wealth	1989, 1991, 1993, 1995
Netherlands	Housing Demand Survey	1993-94
New Zealand	Household Economic Survey Census	1997 1996
United Kingdom	Family Resources Survey	1995-96
United States	Current Population Survey	1997

Note: the four survey years for Italy were merged into a single cross-section

A.3 Burniaux *et al.* (1998)

This is another OECD study, but looks at general income-distribution issues rather than specifically at the position of the elderly. Again, it draws on national experts using national data sources. Table A.5 lists the data sources, Table A.6 the contributors. We have made limited use of this study - only using it to compare results between studies as a test of robustness - because it excludes the United Kingdom. The original study looked at a series of years from the mid-1970s, but we have only used the most recent year of data.

Table A.5 Datasets used in Burniaux *et al.*, 1998

	Survey	Year	Sample
Australia	Household Expenditure Survey	1993-94	9 700
Belgium	Ministry of Finance data from tax files	1995	25 000
Canada	Survey of Consumer Finances	1994	45 000
Denmark	Law Model database	1994	1 in 30
Finland	Income Distribution Survey	1995	12 800
France	Revenus Fiscaux	1990	33 000
Germany	Socio-Economic Panel	1994	4 600
Italy	Survey of Household Income and Wealth	1993	8 100
Japan	National Survey of Family Income and Expenditure	1994	60 000
Netherlands	Income Panel Survey	1994	75 300
Norway	Income Distribution Survey	1995	10 000
Sweden	Income Distribution Survey	1994	13 000
United States	Current Population Survey	1994	50 000

Note: The sample sizes given are the number of households except in Belgium, where the sample size is the number of individuals

Table A.6 List of contributors to Burniaux *et al*., 1998

	Contributor	Institution
Australia	Peter Saunders	Centre for Policy Studies
	Robert Urquhart	
Belgium	Ive Marx	Ministry of Finance
	Christian Valenduc	
Canada	Michael Hatfield	Human Resources Development Canada
	Iain Tyrell	
Denmark	Lars Pantmann	Ministry of Finance
Finland	Esko Mustonen	VATT
	Heikki Viitamäki	
France	Bernard Legris	Institut National de la Statistique et des Etudes Economiques (INSEE)
Germany	Markus Grabka	Deutsches Institut für Wirtschaftsforschung (DIW)
Italy	Marco di Marco	Istituto Studi Programmazione Economica (ISPE)
Japan	Fumihira Mishikazi	Economic Planning Agency
Netherlands	Peter Heijmans	Central Bureau of Statistics/Statistics Netherlands
	Hans de Kleijn	
Norway	Jon Epland	Statistics Norway
Sweden	Yvla Andersson	Ministry of Finance
	Thomas Peterson	
United States	John Coder	Luxembourg Income Study
	Tim Smeeding	

A.4 Luxembourg Income Study

Hauser's (1998) paper was commissioned by the International Social Security Association and was presented at a joint OECD-ILO workshop in Paris in December 1997. The data were drawn from the Luxembourg Income Study (LIS), with the exceptions of Greece and Portugal. The data for these countries were gathered as part of the ASEG project (Alterssicherung in der Europäischen Gemeinschaft) at the University of Frankfurt. They are discussed in Ahrens (1996) and Nitis (1996) respectively. Table A.7 shows the years of data used in Hauser's study. Smeeding (2001), for example, describes the LIS database.

Bradshaw and Chen (1996) is also based on this wave of the LIS database. Table A.8 shows the underlying national data sources. Atkinson, Rainwater and Smeeding (1995) and Whiteford and Kennedy (1995) used earlier waves of the LIS. The years of data used are reported in Table A.9.

Table A.7 Luxembourg Income Study and ASEG data used in Hauser, 1998

	Year of survey
Belgium	1992
Canada	1991
Denmark	1992
France	1989
Germany (West)	1989
Greece	1987-88
Ireland	1987
Italy	1989
Luxembourg	1985
Netherlands	1991
Portugal	1989-90
Spain	1990
United Kingdom	1991
United States	1991

Table A.8 Luxembourg Income Study data sources used in Hauser, 1998 and Bradshaw and Chen, 1996

	Survey	Year	Sample
Australia	Survey of Income and Housing Costs	1990	16 300
Belgium	Living Conditions of Households	1992	3 800
Canada	Survey of Consumer Finances	1991	21 600
Denmark	Income Distribution Survey	1992	12 900
Finland	Income Distribution Survey	1991	11 700
Germany	Socio-Economic Panel	1989	4 700
Italy	Bank of Italy Income Survey	1991	8 200
Netherlands	Socio-Economic Panel	1991	4 400
Norway	Income and Property Distribution Survey	1991	8 100
Spain	Expenditure and Income Survey	1992	16 000
Sweden	Income Distribution Survey	1992	12 500
UK	Family Expenditure Survey	1991	7 100
US	Current Population Survey	1991	16 100

Table A.9 Luxembourg Income Study data used in Atkinson, Rainwater and Smeeding, 1995 and Whiteford and Kennedy, 1995

	Atkinson	Whiteford
Australia	1985-86	1985-86
Austria	1987	
Belgium	1988	1985
Canada	1987	1987
Finland	1990	
France	1984	1984
Germany	1984	1984
Ireland	1987	
Italy	1986	1986
Luxembourg	1985	1985
Netherlands	1987	1987
New Zealand	1987-88	
Norway	1986	
Sweden	1987	1987
Switzerland	1982	
UK	1986	1986
US	1986	1986

Note: Finland, the Netherlands and New Zealand were not formally part of the Luxembourg Income Study database, but national experts provided information to Atkinson, Rainwater and Smeeding using the same methodology

A.5 Förster and Pellizzari (2000)

This study for the OECD was again based on reports from national experts following detailed terms of reference. Table A.10 reports the underlying national data sources.

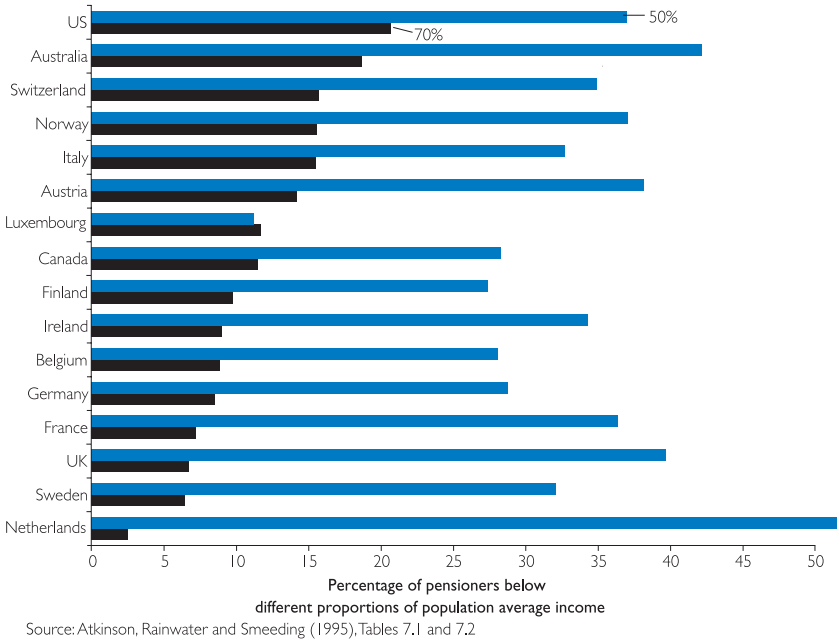
Table A.10 Datasets underlying Förster and Pellizzari (2000)

	Survey	Years
Australia	Household Expenditure Survey	1976, 1984, 1994
Austria	Microcensus	1983, 1995
Belgium	Tax records	1983, 1995
Canada	Survey of Consumer Finances	1975, 1985, 1995
Denmark	Law model data base	1983, 1994
Finland	Income Distribution Survey	1976, 1986, 1995
France	Family Budget Survey	1984, 1989, 1994
Germany	Socio-Economic Panel	1984, 1989, 1994
Greece	Household Budget Survey	1974, 1988, 1994
Hungary	Socio-Economic Household Panel	1991/92, 1997/98
Ireland	Survey of Income Distribution and Living in Ireland Survey	1987, 1994
Italy	Survey of Household Income and Wealth	1984, 1991, 1993
Japan	Comprehensive Survey of Living Condition of the People on Health and Welfare	1985, 1995
Mexico	Survey of Household Income and Expenditure	1977, 1989, 1994
Netherlands	Income Survey and Income Panel Survey (based on tax records)	1977, 1985, 1990, 1994
Norway	Income Distribution Survey	1986, 1995
Sweden	Income Distribution Survey (based on tax records)	1975, 1983, 1990, 1994
Switzerland	Survey on Living Standards, Income and Wealth	1992
United Kingdom	Family Expenditure Survey	1975, 1985, 1991, 1995/96
United States	Current Population Survey	1974, 1984, 1995

A.6 Department of Social Security (2000*a*)

The United Kingdom's official Pensioners' Incomes Series relies on two household surveys. The Family Expenditure Survey (FES) is used for 1979 to 1996-97, while more recent studies are based on the Family Resources Survey (FRS), which has been undertaken since 1994-95. The main advantage of the new FRS is the larger sample size, with around four times as many pensioner income units as the FES. The FRS, however, excludes households in Northern Ireland, which are included in the FES sample. FRS surveyors collect more data directly from documentation (pay-slips, benefit books *etc*.). This should mean that the income data are more reliable than the FES. Finally, the procedure for re-weighting households to reflect differential non-response is more finely tuned in the case of the FRS. In particular, the FES sample is adjusted to reflect lower response rates from richer households, but this adjustment does not also take account of age differences in non-response. In terms of the results, the most important difference between the two surveys relevant to the analysis of incomes of the elderly is that FRS records significantly lower levels of investment incomes for single pensioners than the FES.

Figure B.1 Poverty rates at different poverty thresholds in 16 countries



Source: Atkinson, Rainwater and Smeeding (1995), Tables 7.1 and 7.2

Table B.1 Comparison matrix for poverty rates: proportion of pensioners with incomes below 40 per cent of average

	Smeeding	Whiteford
Hauser	Correlation: 0.99 (0.09) Means: 6,6 Observations: 3 UK: 9,n/a	Correlation: 0.64 (0.06) Means: 5,5 Observations: 9 UK: 9,1
Smeeding		Correlation: 0.93 (0.07) Means: 7,7 Observations: 4 UK: n/a,1

Table B.2 Comparison matrix for poverty rates: proportion of pensioners with incomes below 60 per cent of average

	Smeeding	Whiteford
Hauser	Correlation: 0.88 (0.32) Means: 21,24 Observations: 3 UK: 40,n/a	Correlation: 0.64 (0.00) Means: 22,22 Observations: 9 UK: 40,27
Smeeding		Correlation: 0.99 (0.00) Means: 31,34 Observations: 4 UK: n/a, 27

Table B.3 reports the rank correlation coefficient for poverty rates and their significance levels.[106] Studies that are significantly different at the ten per cent level are indicated by grey shading of the relevant cell. The last line of each cell gives the number of countries where the two relevant studies overlap.

The studies numbered 1-10 are analyses of the Luxembourg Income Study while the remainder are the studies surveyed in this report.[107] The first seven of these, based on the first wave of data, give reassuringly similar results. These consistently rank the United Kingdom at the bottom or near to the bottom of the distribution. Later studies paint a more conflicting picture. Correlations between results are typically poor, and the United Kingdom's position varies from nearly the top to the bottom of the range.

[106] Formally, these are Kendall's rank correlation coefficients, t_a. These are more accurate for small samples than the traditional Spearman coefficient.

[107] They are respectively Smeeding *et al.* (1985), Smeeding, Torrey and Rein (1987), Smeeding (1988), OECD (1988), Palme (1989), Rainwater (1990), Hedström and Ringen (1990), Smeeding *et al.* (1992), Kohl (1990), Smeeding (1992) and Rainwater (1992).

Table B.3 Comparison matrix for rankings of poverty rates in 18 studies

8	UK rank	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	5/7	0.87 (0.02) 6	0.87 (0.02) 6	1.00 (0.01) 6	1.00 (0.01) 6	0.71 (0.04) 7	0.90 (0.01) 7	1.00 (0.30) 3	0.20 (0.81) 5	0.33 (0.37) 7	0.33 (0.45) 6	0.60 (0.13) 6	0.00 (1.00) 4	0.20 (0.71) 6	0.33 (0.73) 4	-0.67 (0.31) 4	0.33 (0.22) 5	0.60 (0.22) 5
2	8/8		1.00 (0.00) 7	0.71 (0.02) 8	0.75 (0.01) 8	0.79 (0.01) 8	0.73 (0.06) 6	0.67 (0.31) 4	-0.07 (1.00) 6	0.14 (0.71) 8	0.24 (0.55) 7	0.62 (0.07) 7	0.00 (1.00) 4	0.24 (0.55) 7	0.67 (0.31) 4	-0.20 (0.81) 5	0.00 (1.00) 4	0.20 (0.71) 6
3	8/8			0.81 (0.02) 7	0.82 (0.01) 8	0.79 (0.01) 8	0.73 (0.06) 6	1.00 (0.30) 3	0.14 (0.76) 3	0.21 (0.54) 8	0.36 (0.27) 8	0.64 (0.04) 8	0.20 (0.71) 6	0.00 (1.00) 8	0.80 (0.09) 5	0.20 (0.71) 6	0.00 (1.00) 4	0.33 (0.37) 7
4	7/8				0.96 (0.00) 8	0.50 (0.11) 8	0.87 (0.02) 6	1.00 (0.09) 4	0.20 (0.71) 6	0.00 (1.00) 8	0.23 0.55 7	0.43 0.23 7	-0.20 0.81 5	0.05 1.00 7	0.33 0.73 4	-0.20 0.81 5	-0.33 0.73 4	0.20 0.71 6
5	8/9					0.56 (0.05) 9	0.87 (0.02) 6	0.83 (0.15) 4	0.33 (0.37) 7	0.17 (0.60) 9	0.32 0.32 8	0.46 0.13 8	0.00 1.00 6	-0.11 0.80 8	0.60 0.22 5	0.20 0.71 6	-0.33 0.73 4	0.33 0.37 7
6	12/12						0.62 (0.07) 7	0.67 (0.31) 4	0.39 (0.21) 8	0.41 (0.07) 12	0.53 0.04 10	0.61 0.03 9	0.25 0.45 8	0.22 0.42 10	0.52 0.13 7	0.39 0.21 8	0.33 0.73 4	0.53 0.06 9
7	5/6							1.00 (0.30) 3	0.40 (0.46) 5	0.24 (0.55) 7	0.20 0.71 6	0.73 0.06 6	0.00 1.00 4	0.07 1.00 6	0.67 0.31 4	-1.00 0.09 4	1.00 0.30 3	0.40 0.46 5
8	4/4								-0.33 (1.00) 3	-0.33 (0.73) 4	0.33 1.00 3	1.00 0.30 3	0.33 1.00 3	—	—	—	—	0.33 1.00 3
9	2/8									0.79 (0.01) 8	0.79 0.01 8	0.14 0.76 7	0.07 1.00 6	-0.43 0.17 8	0.20 0.71 6	0.19 0.65 7	0.33 0.73 4	0.64 0.04 8
10	2/13										0.85 0.00 11	0.60 0.17 9	0.39 0.28 8	-0.11 0.72 10	0.14 0.71 8	0.18 0.62 8	0.67 0.31 4	0.87 0.01 10
11	3/14											0.09 0.76 11	0.33 0.25 9	-0.14 0.54 13	0.18 0.53 10	0.11 0.80 8	0.40 0.46 5	0.89 0.00 11
12	14/14												0.06 0.92 9	-0.06 0.84 12	0.49 0.06 10	0.05 1.00 7	0.800 0.09 5	0.22 0.47 9
13	15/1													0.31 0.24 10	0.07 1.00 6	0.00 1.00 6	0.40 0.46 5	0.33 0.37 7
14	13/14														-0.04 0.94 11	-0.11 0.80 8	0.60 0.22 5	-0.16 0.59 10
15	6/8															0.00 1.00 7	1.00 0.30 3	0.31 0.29 9
16	—																-0.67 0.31 4	0.25 0.45 8
17	4/11																	0.67 0.31 4

APPENDIX C EQUIVALENCE SCALES

Equation (1) shows a general, simple equivalence scale. Equivalent income (Y_E) is the ratio of the household's gross income divided by the number of people in the household (n) raised to the power of the 'equivalence elasticity', e:

$$Y_E = \frac{Y}{n^{\varepsilon}} \qquad (1)$$

The main issue in the choice of the equivalence elasticity is the degree of economies of scale that people benefit from when they live together. Is the maxim that 'two can live as cheaply as one' true? Some elements of households' consumption have the characteristics of public goods as described in the economics literature.

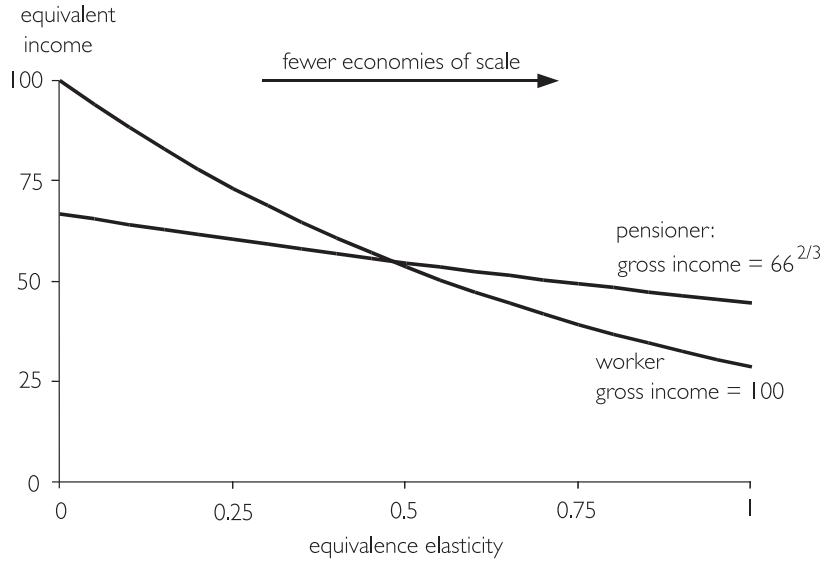
An equivalence elasticity of one implies that there are no economies of scale. Equivalent income is income divided by the number of people in the household. A household of two people would need to have twice as much income as a person living alone to have the same standard of living on this measure.

At the other extreme, an equivalence elasticity of zero means that 'equivalent' income is simply the household's gross income. An extra household member has no effect on the household's standard of living, implying that they require no extra resources.

Burniaux *et al*. (1998), Förster and Pellizzari (2000), Smeeding and Saunders (1998) and Antolín, Dang and Oxley (1999) use an equivalence elasticity of 0.5. Thus, equivalent income is gross income divided by the square root of household size.

Figures C.1 and C.2 use a simple example to show the impact of the choice of equivalence scale on measures of the relative living standards of elderly and working age households. We assume that elderly households have an average of 1½ people and working age households 3½. Figure C.1 shows equivalent income for a working age household with a gross income of 100 and an elderly household with a gross income of two-thirds of that level. The bottom scale shows the assumed equivalent elasticity between the two extreme values of zero and one. At zero, of course, the equivalent income is simply the gross income of the household. As the elasticity increases, the equivalent income of the working age household declines more rapidly. With an equivalence elasticity of unity - implying no household level economies of scale - the worker's equivalent income is 28.5 (100 divided by 3½) and the pensioner's is 44.5 ($66^2/_3$ divided by 1½).

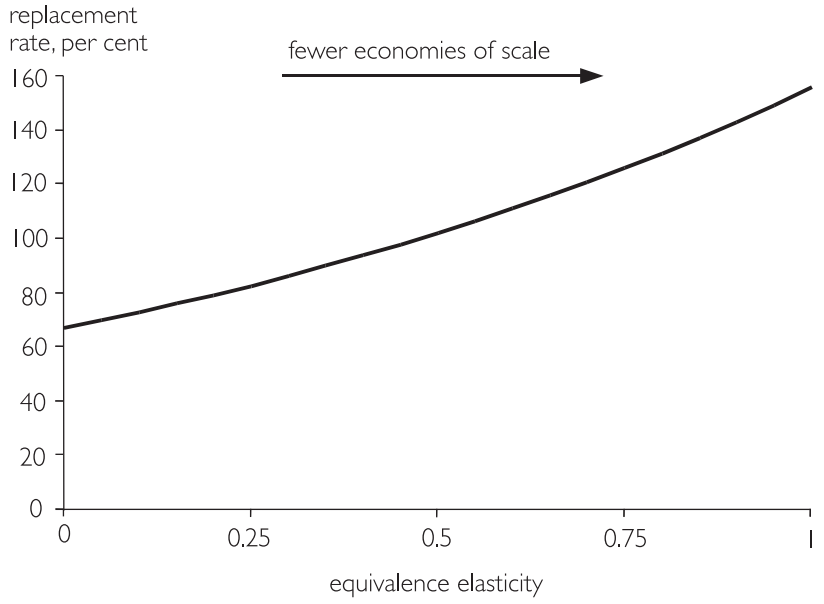
Figure C.1 Equivalent incomes of workers and pensioners by equivalence elasticity



Source: authors' calculations

Figure C.2 shows the implications of the choice of equivalence elasticity for a measure of the 'replacement-rate': the ratio of the pensioner's income to the worker's income. Now the effect is more pronounced. The replacement rate increases from two-thirds when gross incomes are compared (the equivalence elasticity is zero) to 155 per cent with an equivalence elasticity of unity. Even between elasticities of 0.25 and 0.75, the replacement rate of equivalent income varies between 82 and 125 per cent.

Figure C.2 Replacement rate by equivalence elasticity: ratio of equivalent income of pensioner household to equivalent income of working-age household



Source: authors' calculations

Other studies use equivalence scales that differentiate between children and adults. The reasoning is that additional children 'cost' less than an extra adult in a household would. Johnson (1998, 1999) and Hauser (1998) use the OECD (1982) equivalence scales. The 'old' scale is:

$$Y_E = \frac{Y}{1 + 0.7n_a - 0.5n_c} \quad (2)$$

where n_a is the number of adults after the first and n_c the number of children in the household. The 'new' scale uses weights of 0.5 for additional adults and 0.3 for children. The treatment of children might seem tangential to a study of incomes and poverty in old age. However, measures of pensioners' incomes only make sense when measured against working age households or the population as a whole, especially in international comparisons of countries with differing income levels.

Figure C.3 compares the three scales used in practice (new and old OECD and the scale with equivalence elasticity of 0.5) with the two benchmark cases (household gross income unequivalised and *per-capita* income). The figure uses five sample family types, with household size again increasing as we move to the right. The vertical axis shows the adjustment applied by that scale. For example, the income of a couple with two children is adjusted by multiplying by the following coefficients:

- 0.5 under the equivalence-elasticity approach ($^1/\sqrt{_4}$).
- 0.37 under the old OECD scale ($^1/_{2.7}$ *i.e.*, the reciprocal of 1 plus 0.7 for the second adult and 0.5 for each of the two children).
- 0.48 under the new OECD scale ($^1/_{2.1}$ *i.e.*, the reciprocal of 1 plus 0.5 for the second adult and 0.3 for each of the two children).

The effects on measured equivalent incomes are very large: the new OECD scale would rate a two adult, two child family as over 28 per cent richer than the old OECD scale. The equivalence elasticity approach gives a slightly higher result still: 35 per cent above the old OECD scale. These differences will be significant if the elderly live in households of a systematically different size and age structure from the rest of the population.

Figure C.3 Adjustments to gross incomes under different equivalent scales by family type

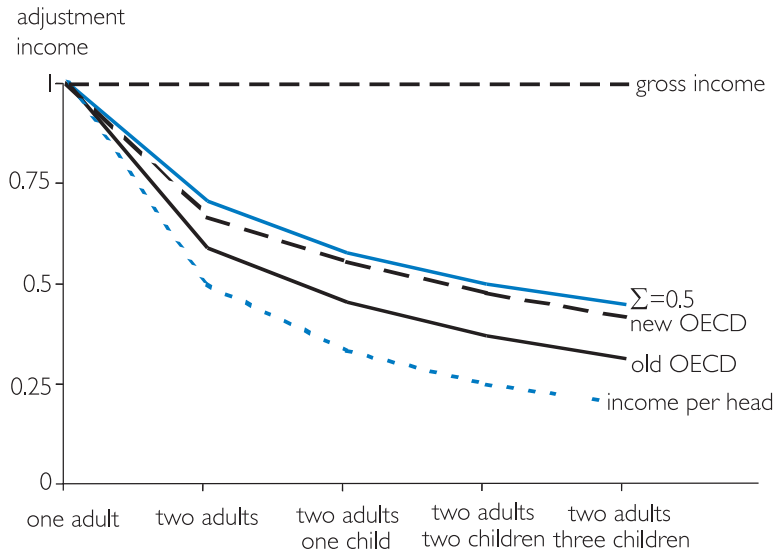
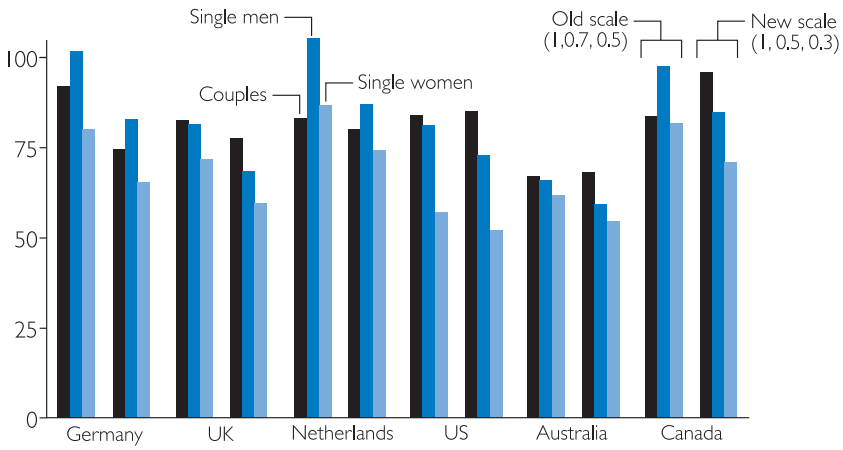


Figure C.4 shows the effect of the choice of equivalence scale on the measurement of 'replacement rates': the ratio of pensioner incomes to non-pensioner incomes. For each of the six countries, the left-hand set of bars shows the result using the old OECD scale while the right-hand bars are based on the new scale. Single pensioners' relative incomes decline in each case because adjusted incomes for all non-single-person households are increased. In Australia and Canada, replacement rates fall by an average of seven percentage points, while in the other four countries they are over 10 points lower. In Australia, Canada and the United States, pensioner couples' replacement rates are higher under the new scales. In the Netherlands and the United Kingdom, they are lower, but only by a small amount. The data for Germany stand out. First, because pensioner replacement rates in all three demographic groups fall by much more with the change in equivalence scale than in other countries (by between 14 and 19 percentage points). Secondly, because married couples exhibit a relatively large decline compared with other countries, larger than the fall in measured income for single women.

The effect on countries' relative replacement rates, given the similarity of the pattern in the changes, is not large. The only significant difference in ranking between the two scales is for married couples in Germany, with the highest replacement rate when measured on the old OECD scale and the second lowest on the new OECD scale.

Figure C.4 The impact of two alternative equivalence scales: pensioner incomes as a percentage of non-pensioner incomes in six countries by sex, marital status and equivalence scale



Source: Johnson (1999), Table 11

Hauser (1998) also compares pensioner incomes relative to workers' incomes using the old and new OECD equivalence scales. His results show a much more uniform pattern across countries. Among 65-74 year olds, the average replacement rate is 7½ per cent lower. This varies across countries between six and nine per cent, with no effect on the relative position of different countries' replacement rates. The effect of changing the equivalence scale is slightly greater among the over 75s. The average replacement rate is 10 per cent lower when measured under the new scale rather than the old, ranging between eight and 12 per cent. However, there are only three, limited re-rankings of countries' replacement rates when the new equivalence scale is substituted for the old.

There are many different approaches to choosing an equivalence scale. Most scales in practice, however, are implicitly or explicitly a matter of judgement. Many national studies use the scale implicit in the structure of social-security benefits comparing, for example, the minimum safety-net income for a single person with the minimum for a married couple. Typical results are an equivalence elasticity of between 0.5 and 0.6. International studies, as noted above, have used elasticities between 0.5 and 0.77 (the old OECD scale).

A less subjective method is to compare households' consumption patterns. But the enormous literature on this issue has produced little consensus. Although most results imply an equivalence elasticity between 0.4 and 0.5, there are many examples both above and below this range.

This analysis has shown that the choice of equivalence scale can have important effects on the living standards of the elderly relative to the population and on the incomes of pensioners relative to pensioners of different sex or marital status.[108]

[108] Förster (1994) shows that aggregate poverty rates tend to be higher the lower equivalence elasticity. But in most countries, poverty rates also tend to rise as the equivalence elasticity approaches unity (*i.e.*, the measure is income per head). Poverty rates plotted against the equivalence elasticity are therefore U-shaped.

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