How Poor are the Old? A Survey of Evidence from 44 Countries

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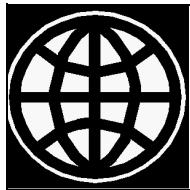
Social Protection Discussion Paper Series

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PENSION REFORM PRIMER

re·for′m *v.t. & i.* **1.** make (institution, procedure *etc.*) better by removal or abandonment of imperfections, faults or errors

primer *n.* **1.** elementary book to equip person with information

pe´nsion *n.* **1.** periodic payment made on retirement or above specified age

How poor are the old?
A survey of evidence from 44 countries

Edward Whitehouse[*]

This paper surveys 11 international comparative studies of poverty, income distribution and the elderly. Although it focuses on OECD economies, some 44 countries are covered.

The paper 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 old poorer than younger pensioners? 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.

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How poor are the old?
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Edward Whitehouse

'Our dream is a world free of poverty' — the World Bank's mission

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. How can we measure countries' success at achieving this goal?

A common method, termed the 'institutional approach', is to estimate future pension entitlements of a range of workers with different characteristics.[1] This method applies the pension system's parameters — such as accrual rates, survivors' benefits, minimum pensions, indexation rules, eligibility requirements *etc.* — to workers with different age-earnings profiles and employment records and calculates pension benefits. The results are usually expressed as replacement rates: the ratio of the pension benefit either to the individual's earnings or to a measure of economy-wide earnings.

This institutional approach has a number of problems. First, it typically assumes that the pension system and its parameters remain unchanged in the future. Or it makes simple assumptions about prospective policy changes to deal with future increases in pension costs: for example, that the benefit replacement rate will be reduced or the contribution rate increased to bring pension system costs and revenues into balance. But the frequency and the scale of

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[1] Aldrich (1982), Blöndal and Scarpetta (1998), Eurostat (1993), Table 1.1 of Johnson (1999), McHale (1999) and Whitehouse (2000) are examples of the institutional approach.

past pension reforms suggest that future pension regimes will look very different from today's systems in complex ways.[2]

Secondly, looking at pension replacement rates alone ignores other resources on which the elderly can draw. The elderly have investments and non-financial wealth, especially housing, to support their old age, in addition to their pension benefits. Many institutional analyses ignore social-assistance benefits, which are often important in protecting the old, especially the poorest old. Most also exclude private pensions, which can cover many or most workers and provide a substantial component of retirement incomes.

Thirdly, the institutional approach also focuses on individual replacement rates. This misses the fact that living standards of the elderly are determined by the total resources of the households in which they live as well as their own incomes. Even in richer countries, a substantial minority of older people lives with relatives and in poorer countries this is often the dominant living arrangement.

Fourthly, institutional studies typically present gross replacement rates, which understate pensioners' relative incomes for a number of reasons. Pensioners do not pay social-security contributions. Personal income taxes are progressive: the average tax rate on (lower) pension income will be less than the tax rate on (higher) earned income. Also, most income tax systems give preferential treatment to pensions (exempting some or all of income from tax) or to pensioners (giving additional allowances, credits or zero-rate bands to the elderly). Replacement rates net of taxes and contributions are higher than gross figures.[3]

Finally, institutional measures give only a snapshot picture of pension replacement rates at pensionable age. This ignores the dynamics of income after retirement. Although countries have tended to move towards indexation of benefits after retirement to prices, some use a more generous formula. And many governments have uprated pensions by less than the formula in response to short-term fiscal problems. Also, these analyses rarely look at survivors' benefits and, particularly, the effect of widowhood on incomes of the elderly.

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[2]   McHale (1999) studies the impact of reforms on future pension entitlements in the G7 countries. Diamond (1997) argues that pension systems can be excessively responsive to short-term fiscal conditions (given the limited ability of the elderly to absorb these changes).
[3]   See Whitehouse (1999) and Disney and Whitehouse (1999), section 6 for an illustration.

This paper, in contrast, looks directly at actual pensioner incomes, what might be termed an 'empirical' approach. It compares current pensioners' incomes with current workers' incomes to assess the living standards of the elderly against those of society as whole. This method also has its problems. First, it is not very effective at assessing current pension systems. Today's pensions depend on past rules of the pension system, which have everywhere changed significantly. This will also affect the pattern of pensioners' incomes. With an immature scheme, incomes of the elderly will decline sharply with age, but it would be a mistake to treat this an argument for paying higher benefits to older pensioners, because the pattern will change over time. The same is true if the pension system provides, or provided in the past, inadequate protection against the effect of inflation on retirement incomes. Secondly, pension-entitlement outcomes depend on people's past earnings and employment records. Therefore macroeconomic conditions, themselves in a constant state of flux, will also feed through to observed pensioners' incomes. Finally, pensioners' investment incomes depend on their past savings behavior. Again, the value of investments will depend on past macroeconomic conditions, but also on the changing tax treatment of savings and people's attitudes to the security of their future public pension benefits. It is important to bear these caveats in mind when drawing policy implications from the empirical results presented here.

This paper addresses many different questions. It begins by comparing average pensioner incomes to average non-pensioner and population incomes. These averages, however, can disguise a range of differences between different households in the two groups. The next section of the paper, therefore, 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, the paper looks at the characteristics of low-income groups, by age, sex and living arrangements. Are the oldest old poorer than the younger old? How do widows fare? The subsequent section looks at the income sources of the elderly. How important are public pension and other benefits, private pensions and investments? How does this vary between the richer, poorer and middle-income pensioners? Section 6 then examines income trends: are today's pensioners better off than in the past? Have they fared better or worse than workers have? Finally, the paper looks at individual income dynamics in retirement. Are the elderly poor persistently poor?

This initial study surveys the existing comparative literature. It mainly draws on data from 11 international studies covering 44 different countries, which are listed in Table 1.[4] Existing studies are limited mainly to OECD member countries. We have also examined the World Bank's poverty assessments.[5] Few, however, provide empirical evidence on the economic status of the elderly.[6] Moreover, the reports use a wide range of different methodologies, preventing meaningful international comparisons.

Table 1. **Coverage of the paper**

OECD	Latin America/ Caribbean	Eastern Europe/ Central Asia	Other
Australia	Brazil	Bulgaria	Israel
Belgium	Chile	Czech Republic	Taiwan
Canada	Colombia	Estonia	
Denmark	Dominican R	Hungary	
Finland	Costa Rica	Kirgizistan	
France	Ecuador	Poland	
Germany	El Salvador	Russia	
Greece	Honduras	Slovak Republic	
Ireland	Jamaica		
Italy	Mexico		
Japan	Nicaragua		
Luxembourg	Panama		
Netherlands	Peru		
New Zealand	Venezuela		
Norway			
Portugal			
Spain			
Sweden			
United Kingdom			
United States			

Note: the Czech Republic, Hungary, Mexico and Poland are now members of the OECD but are shown here with their regional counterparts

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[4] Note that there is significant overlap: the studies cover a total of 79 countries, meaning that countries are covered, on average twice.

[5] Pallares-Miralles and Whitehouse (2000).

[6] This is also true for studies of OECD countries, whose focus is mainly on the working-age population. In particular, the impact of social change (such as increasing numbers of lone parents) and economic change (such as broadening distribution of earnings) on the income distribution have been widely analyzed.

In response to this second difficulty, the World Bank established the Living Standards Measurement Study (LSMS) to collect data from different countries on a comparable basis.[7] A companion paper to the current one will add another 20 countries from LSMS, including poorer countries in Latin America, Africa, Eastern Europe and East Asia. Another World Bank initiative to build internationally comparable data covers six Eastern-European and former-Soviet-Union economies: the Household Expenditure and Income Data for Transitional Economies (HEIDE) data set.[8]

This paper is the first in a series on poverty and income distribution issues in the design of old-age pension systems. The second part of the study will investigate the effects of living arrangements and other forms of intra-familial support on older people's living standards. The third part will look in more detail at the distributional impact of public pension systems. This study will look at both intra- and inter-generational redistribution: how the pension system affects people's lifetime incomes, taking account both of contributions and benefits, and how it affects different date-of-birth cohorts. The final paper in the series will draw together the implications for pension system design and pension reform.

1. Measurement issues

Before turning to the empirical results, this section provides a guide to some on the measurement issues we encountered later on. 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?

There are two basic approaches to defining poverty: an absolute standard and a relative standard.[9] One type of absolute standard compares people's resources with a minimum level

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[7]   Grosh and Glewwe (1995) and Deininger and Squire (1996) describe the study.

[8]   Grootaert and Braithwaite (1998) present results from this dataset.

[9]   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 a much higher income level than official poverty lines. Examples include Colasanto, Kapteyn and van der Gaag (1984), Danziger *et al.* (1984), De Vos and Garner (1991), Goedhart *et al.* (1977), Van den Bosch *et al.* (1993), Piachaud (1987), Van Praag *et al.* (1982) and Walker (1987). In

of consumption to support basic needs (food, shelter *etc.*). [10] Another type compares peoples' incomes with the minimum, safety-net income specified by the social assistance system. [11]

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 changes 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. [12]

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 equalize the cost of population expenditure and not the consumption of the poor. [13] 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. [14] Finally, relative poverty rates are endogenous to the household survey data and so measuring them requires less information than other methods.

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international comparisons, this 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.

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

[11]   Austria and Germany define poverty relative to social assistance minima. Gustafsson and Lindblom (1993) provide an international study on this basis.

[12]   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.

[13]   Dowrick and Quiggin (1994).

[14]   Eurostat (1990).

Most international studies, therefore, measure poverty as a relative concept, typically the proportions with incomes below some ratio of the average income.[15] 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.[16] 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.[17] 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 and, hence, relatively low current consumption, could count as poor, despite the greater command of resources and higher consumption possibility than a household with a lower income, lower level of saving and the same current consumption.

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,[18] 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,

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[15]   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 higher-income countries.

[16]   Ramprakash (1994) and Eurostat (1990) show 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 types of indicators, see also Cutler and Katz (1992) 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.

[17]   Some of the arguments between income and consumption as an indicator are therefore similar to the question of the relevant accounting period, discussed. below.

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

and this is reflected in studies based on expenditure when households increase their precautionary savings against future income shocks.[19]

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.[20] In Eastern Europe, this problem is exacerbated by the rapid growth of the informal sector of the economy during the economic transition.[21] Survey methods have been slow to adjust to this change, while countries with longer experience of a 'shadow' economy — such as those in Latin America — have had more time to allow for the resulting measurement problems in their survey methodology. 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.[22]

1.3   *Defining income*

The data are based on similar concepts of income, including earnings, public transfers, investment incomes, private pensions *etc.* Typically, they exclude all or at least some kinds of capital gains, because the receipt of 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 distribution. Incomes in kind are also excluded. Two sources of in-kind income are particularly important: imputed rents from home ownership and free or subsidized public services, including social housing.[23] These pose very difficult measurement problems.

Another problem in defining incomes is the treatment of lump-sum distributions from private pensions, which is naturally very important for the relative economic status of the elderly. In Australia, most private pensions are received as a lump sum rather than an annuity stream, and lump sums are also important in Japan, the United Kingdom and the United States.

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[19]   Kimball (1990).
[20]   See, for example, Baker (1993) on the United Kingdom and Revesz (1994) on Hungary.
[21]   As a consequence, Grootaert and Braithwaite (1998) use consumption-based poverty measures in their study of Eastern Europe and the former Soviet Union.
[22]   Kay, Keen and Morris (1984).
[23]   Smeeding *et al.* (1993) attempt to correct international distributional comparisons for differences in non-cash transfers.

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Usually, these are excluded from income measures because they are probably consumed over a longer period than the year in which they were paid. 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 incomes taxes and social-security contributions. Other taxes are ignored. The most significant omission is indirect taxes: 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 both with income and age, the indirect tax burden will also vary. This also has 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 Australia and the United States.[24]

1.4   The unit of measurement: households or families?

Although many elderly people live alone or with their spouse, others live in larger households. Also, 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 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).[25] The 'true' measure of the

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[24]   See OECD (1999). Adema (1999) and Adema *et al.* (1996) show how differences in indirect taxes affect measures of social expenditures.
[25]   Empirical tests of sharing, based on women's labor supply, for example, reject the hypothesis that the household can be treated as a single utility-maximizing unit (Thomas, 1990; McElroy, 1999). Theoretical studies, based on household-bargaining models, imply that the equal-sharing outcome is a special case (Browning *et al.*, 1994). women's increased labor-market participation has resulted in a more equal distribution of income within households (Webb, 1993). This may have changed the intra-familial distribution of resources.

welfare of an individual is likely to lie somewhere between a share of the household income and their own (or their own family unit) income.[26]

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. Table 2 shows the effect on measured poverty rates in the United States (against the official poverty lines) of using the family or the household as the unit of measurement. Similarly, Goodman, Johnson and Webb (1997) 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.

Table 2. **Poverty rates in the United States by unit of measurement, 1993**

per cent	All	Over 65
Family-based	14.6	12.9
Household-based	13.1	12.4

Source: Deaton and Paxson (1995)

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 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 two people with an income of around 1½ times a single person have the same living standard. This adjustment is called an equivalence scale. Appendix B discusses the issues in more detail and describes the scales used in the different studies cited in this paper.

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[26]   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) and Smith *et al.* (1991). There is a large theoretical literature: see Becker (1981*a,b*), for example.

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 labor-market status or pension-benefit receipt. But 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. But many of the elderly in industrialized countries live in institutions: 9 per cent in the Netherlands, for example, and 7 per cent in Finland and Canada. Rates of institutionalization vary internationally, with the elderly infirm living mainly with relatives rather than in homes in some countries. Even among OECD countries, less than 1 per cent of over 65s in Turkey and Portugal live in institutions and just 2 per cent in Portugal.[28]

1.7   Sample selection

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. But 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.

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[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 on the future (Disney and Whitehouse, 1999 and World Bank, 1999*b*). However, the majority of people typically retire before this age: some studies therefore include people under 65 who are not in work.

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

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

Some studies use proportions of the median income in these measures rather than proportions of the mean. As is well known, the mean is more affected by outliers (with very high incomes) than the median, which is more robust. And the median income is always lower than the mean because income distributions are positively skewed. These differences in measure again can affect the results significantly and 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.[29] 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 section 8 below.

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[29]   Ravallion (1988) and Chesher and Schluter (1999).

1.10   *Interpreting replacement rates*

The results in the paper 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, some use the population.   The latter will give lower pensioner replacement rates if pensioners' incomes are less than the population as a whole, and 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 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, but it is difficult to isolate the impact of misplaced expectations of retirement income from any desired reduction in spending.[31]

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

Box 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 (ranging from 20 to 70 per cent of median income).

Secondly, head-counts show the incidence of poverty but say nothing about the degree to which incomes fall below the poverty threshold, 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': the proportion of 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-α': 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).

Other important questions include the pattern of marginal utility of income with age.[32] The very elderly, for example, may be unable to enjoy expensive leisure pursuits. (Although they may, of course, have large health and care costs.) 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.[33] This points to a higher than desired replacement rate in retirement, but it may reflect the elderly undoing the degree of annuitization of their wealth in public and private pension schemes.[34] For example, there may be precautionary motives for saving (healthcare costs *etc.*) or a desire to bequeath wealth to children[35] or to charity.

2.   The relative incomes of the elderly

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

Figure 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.2.) 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.

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.)

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[32]   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.

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

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

Figure 1. **Pensioner incomes as a percentage of non-pensioner incomes in eight OECD countries, couples**

pensioners incomes,
per cent of non-pensioner incomes
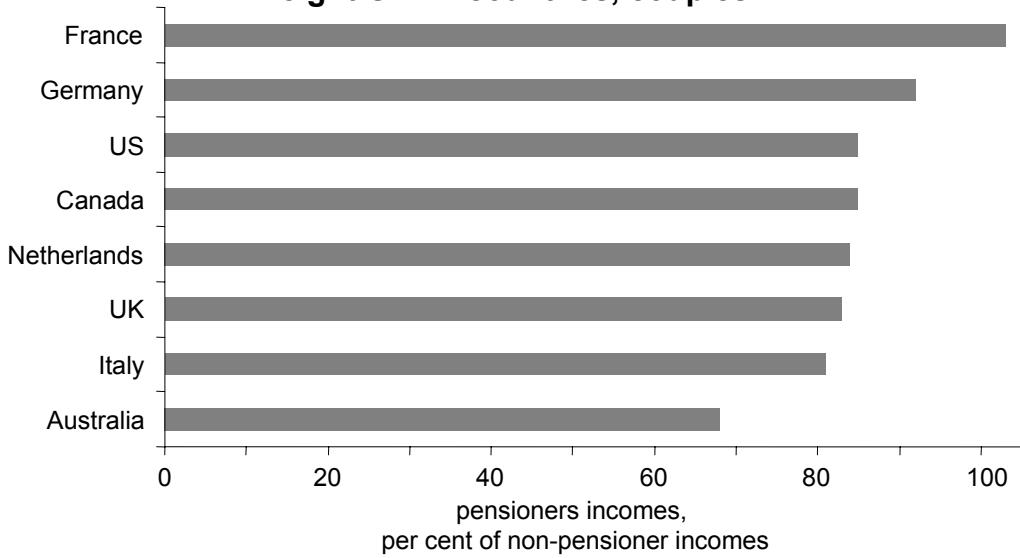
Source: Johnson (1998), Table 4.2
Note: uses an equivalence scale of 0.7 per additional adult in an income unit and 0.5 per additional child: see Appendix B. Pensioners income units defined as all family units headed by someone over 65 or someone aged 60-64 who is not working. See Appendix A.2 for a description of the data

Figure 2 shows the results of a similar analysis from the OECD secretariat. (Appendix A.3 describes the underlying national data sources.) Among the many methodological differences between this and Johnson's study, three are worth pointing out. First, the unit of measurement is not the family unit but the household, defined as people living at the same address and sharing significant resources (kitchen and bathroom, for example, although national definitions of course differ). Secondly, the comparator is population incomes rather than pensioner incomes. Therefore, if pensioner incomes are lower on average, then replacement rates will normally appear higher measured against the population — Figure 2 — than against non-pensioners — Figure 1. Also, the difference will vary with the pensioner share of the population. Thirdly, there is a small difference in the definition of a pensioner: both studies include over 65s, but Johnson adds non-working 60-64 year olds.

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[35] 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).

Figure 2. **Pensioner incomes as a percentage of population average incomes in 11 OECD countries**
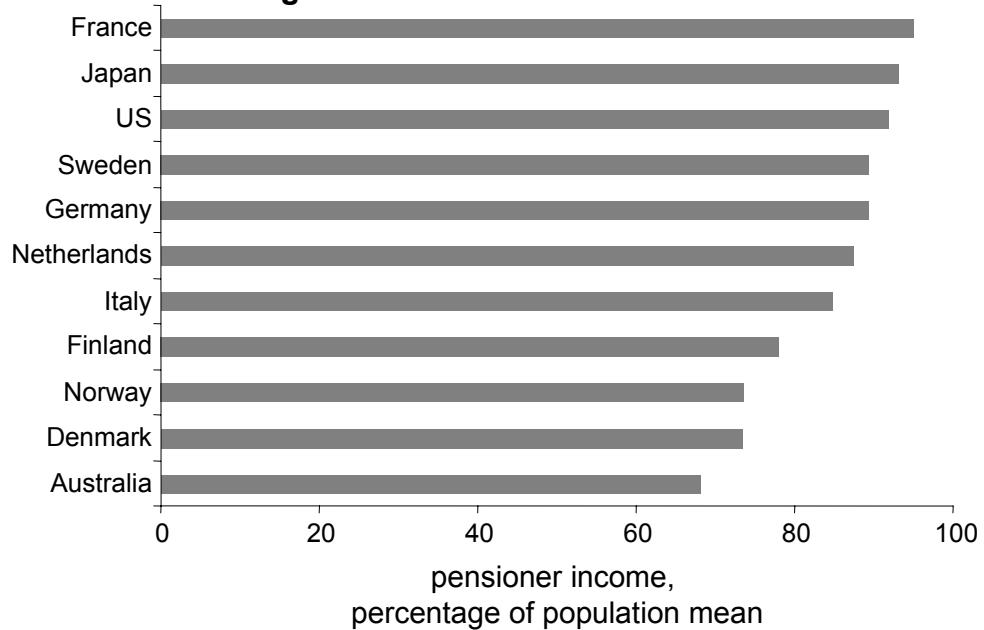
pensioner income,
percentage of population mean

The results, however, are very similar to Johnson's. Again, most countries are bunched around a similar level, with outliers in France at one end of the scale and Australia and three Nordic countries at the other. In the six countries where the two studies overlap, the relative positions of countries are similar. But the OECD secretariat measures replacement rates eight percentage points higher on average than Johnson does.

Figure 3, from Hauser (1998) is based mainly on Luxembourg Income Study data, an international collection of household surveys. (Appendix A.4 describes these data). The sample is very different from the previous two because it is defined by receipt of a pension rather than by age or labor-market status. The sample (presumably) excludes the elderly who receive all their income from social assistance and other government transfers (except public pensions). Also, people of pension age that are in work and do not receive a public pension because of earnings tests or because they have deferred their pension will be excluded.[36] Finally, the sample also covers only 65-74 year olds.

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[36] See Disney and Whitehouse (1999) for a description of these rules.

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Eight of Hauser's sample countries overlap with one of the other two studies. His measured replacement rates are typically higher, and in three cases, substantially higher: Canada (13 percentage points), the Netherlands (20 percentage points) and the United States (16 percentage points). This probably reflects the selection of a sample of people with public pension receipt and the lower age cut off (older pensioners tend to be poorer, see section 2.2 below).

Figure 3. **Incomes of 65-74 year olds as a percentage of population average incomes in 14 OECD countries**

pensioners incomes,
per cent of non-pensioner incomes
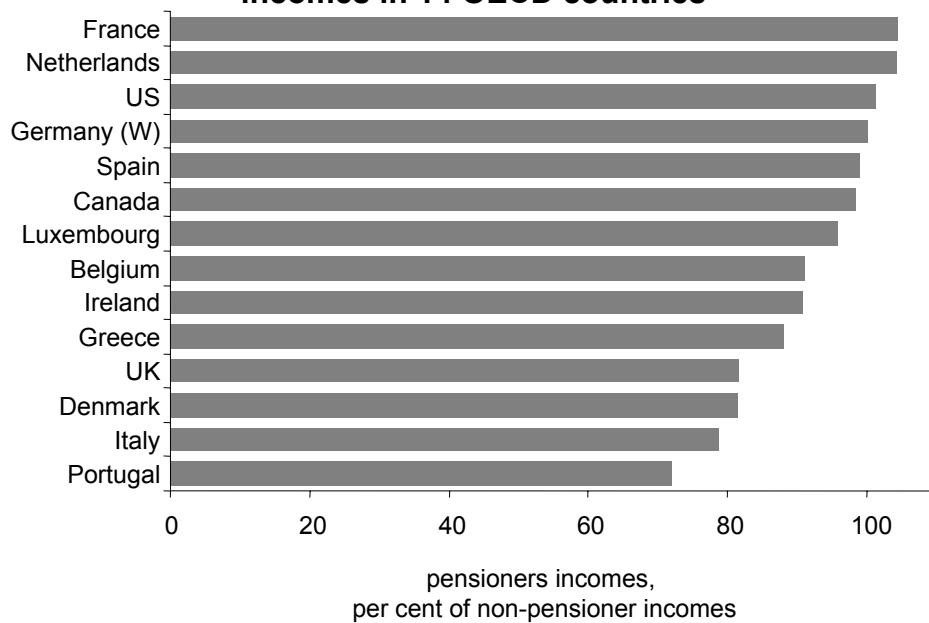
Source: Hauser (1998), Table 4
Note: the data are the ratio of the average net equivalent income of people living in households headed by someone age 65-74 to the average net equivalent income of people living in households headed by people under age 55. See Appendix A.4 for a description of the data

The final study of OECD countries was prepared by Richard Disney for the OECD secretariat. The results are presented in Disney, Mira d'Ercole and Scherer (1998) and Börsch-Supan (1998). Like 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 are either excluded from the analysis or children's incomes are ignored.[37] The study gets round the

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[37] 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.

equivalence-scale problem by presenting results separately by marital status and by focusing on family unit rather than household income.

Figure 4 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. First, pensioners in the first few years after pensionable age tend in most countries to be richer than the whole pensioner population (section 2.2). 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: the overall impact is difficult to predict.

Figure 4. **Pensioners' incomes as a percentage of older workers' incomes in nine OECD countries, couples**

pensioner incomes,
per cent of non-pensioner incomes
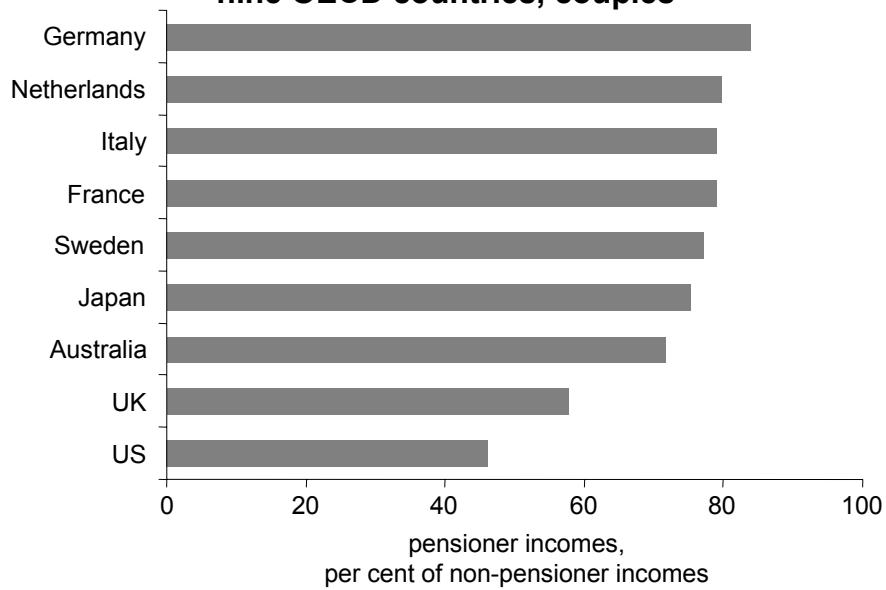
Source: Disney, Mira d'Ercole and Scherer (1998), Figure 1; see also Börsch-Supan (1998), Table 1
Note: compares income of households where the head is aged *circa* 67 with households where the head is *circa* 55. Appendix A.1 describes the source of the data

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 slightly 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 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.[38] 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.

2.1 The effect of sex and marital status

Figure 5 continues with the same dataset as Figure 4, showing the incomes of the elderly relative to older workers, this time for both married couples and single people. 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.

Figure 5. **Pensioners' incomes as a percentage of older workers' incomes by marital status in nine OECD countries**

pensioner incomes,
per cent of non-pensioner incomes
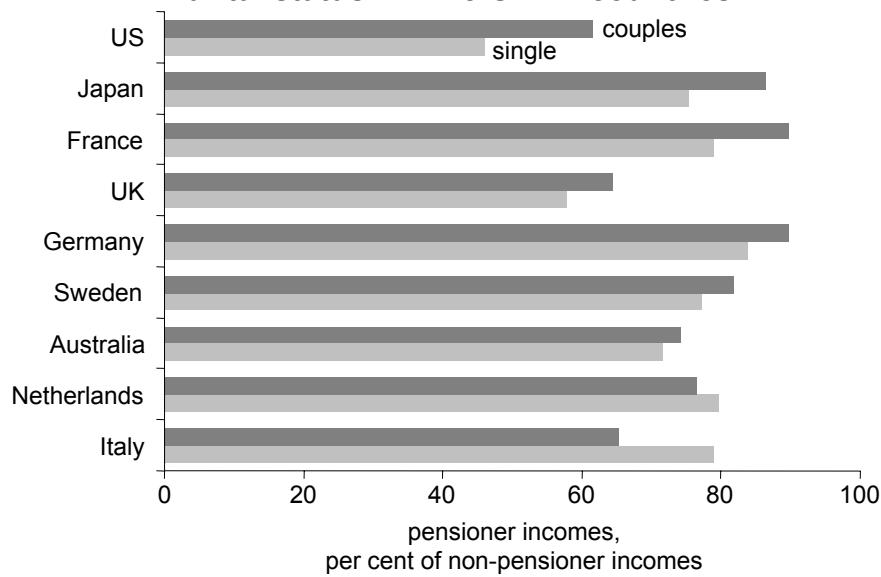
Source: Disney, Mira d'Ercole and Scherer (1998), Figure 1; see also Börsch-Supan (1998), Table 1

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[38]   See the discussion of institutional approaches to the effect of pension systems on the elderly's income in the introduction and Whitehouse (1999).

Figures 6 and 7, based on Johnson (1998) and Hauser (1998) respectively, split the results by sex 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 5 draws — look at married couples and single people directly, bypassing the equivalization problem.

Figure 6. **Single pensioners' incomes as a percentage of married couples by sex in eight OECD countries, equivalized**

single pensioners' incomes,
per cent of married couples' incomes
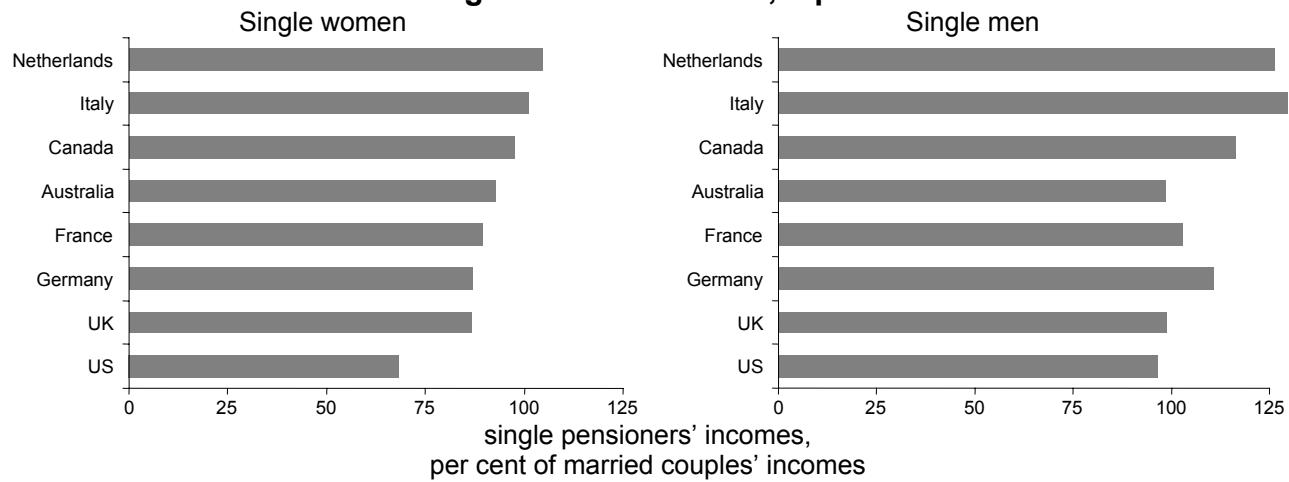
Source: Johnson (1998), Table 4.2

Single women's incomes are generally lower than married couples'. The exceptions in Figure 6, as in Figure 5, are Italy and the Netherlands. Figure 7 also reports higher incomes for single women in Germany and Luxembourg. Single men typically fare better than married couples. In Figure 6, 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 7 reports much higher incomes for single men in the United Kingdom than for married couples and a similar pattern in Denmark and Ireland.

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. This means that the equivalized 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 results in replacement rates for single pensioners that are much closer to those of married couples. 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 test for social assistance depends on household incomes, these single women can have little if any entitlement to public transfers, and so often have little income of their own.

Figure 7. **Single pensioners' incomes as a percentage of married couples by sex in 13 OECD countries, equivalized**

single pensioners' incomes,
per cent of married couples' incomes
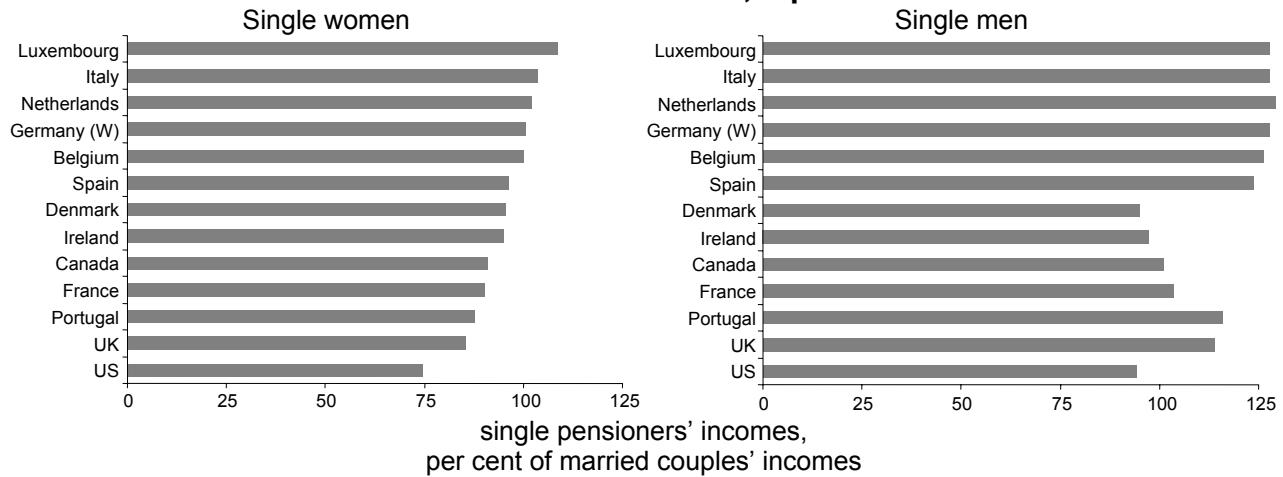
Source: Hauser (1998), Table 5

2.2   The effect of age

Figure 8 shows that pensioner incomes tend to decline with age, with the exceptions of Canada and Australia. In most cases — particularly in the continental European pension systems 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. 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. The reverse pattern in Australia probably stems from the complex behavioral effects of the means-tested system coupled with private pension benefits mainly paid as lump sums.

Figure 8. **Pensioner incomes as a percentage of non-pensioner incomes by age in eight OECD countries, couples**

pensioner income,
percentage of
non-pensioner income
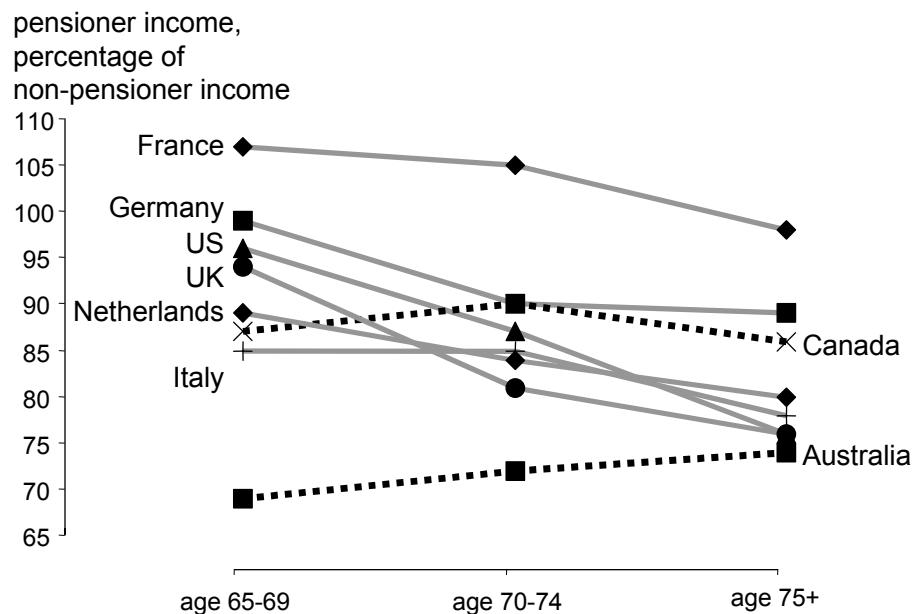
Source: Johnson (1998), Table 4.2

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'.

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. But 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 life-time 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 (Box 2 discusses this problem further). The apparent decline in incomes of older pensioners is therefore a misinterpretation of cross-section data.

Looking at pensioner incomes across time allows 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.

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. Section 2 looked only at pensioners' average incomes. This analysis disguises a large degree of dispersion between different pensioners' economic circumstances.

Figure 9 looks at the position of pensioners in the population income distribution. The population has been divided into tenths (or deciles), from the poorest tenth to the richest. If pensioners' incomes matched the pattern of the population, then a tenth of pensioners would obviously be in each of the population deciles. Hence Figure 9 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, that they are under-represented.

The patterns are remarkably similar between countries. Pensioners tend to be under-represented in the bottom one or two deciles, 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.

Figure 9. **Percentage of pensioners in each decile of the population income distribution in eight OECD countries, equivalized**
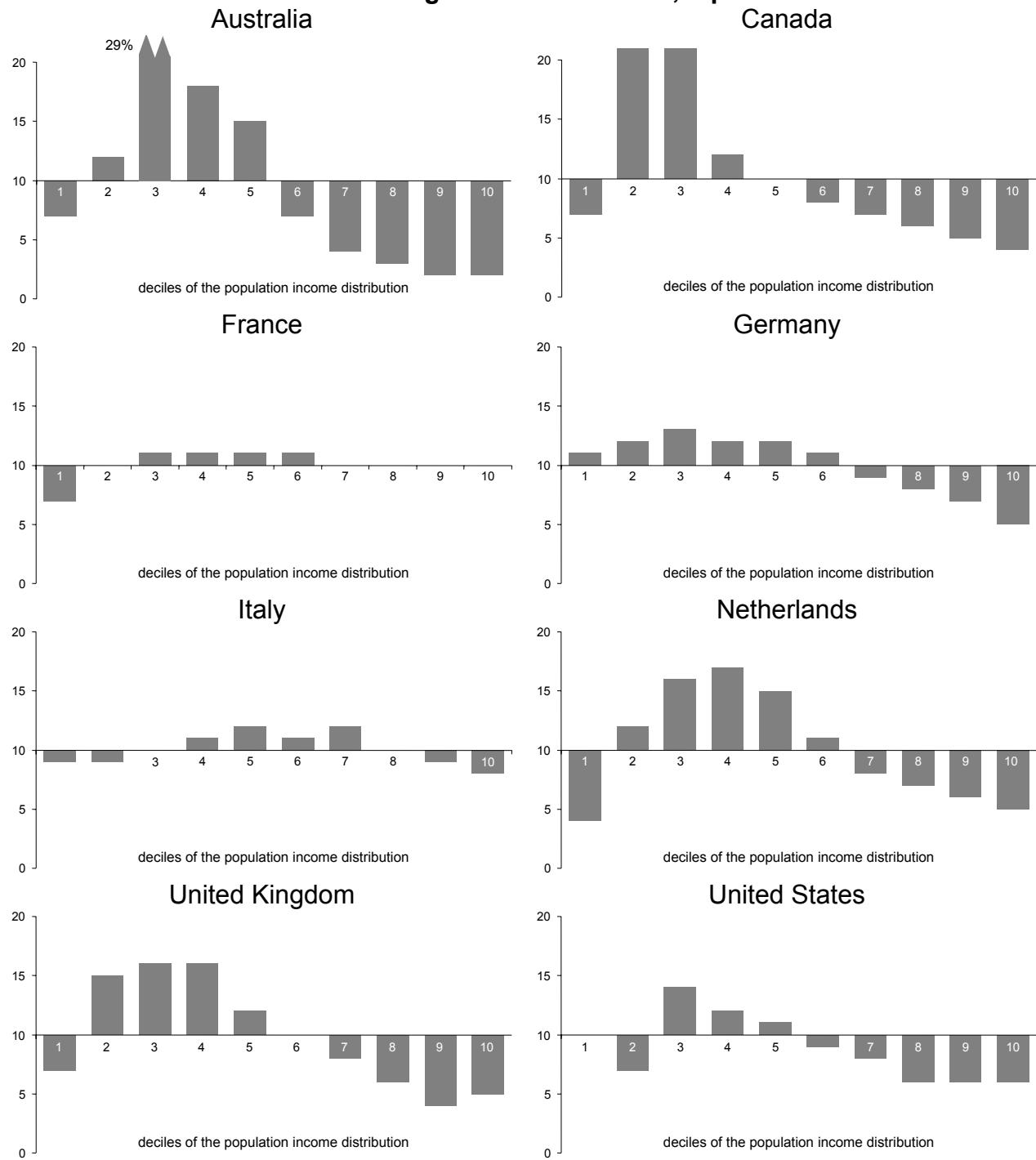
As might be expected, the picture is much flatter in countries with comprehensive old-age social insurance programs, such as France, Germany and Italy. A much greater concentration of pensioners in the low-to-mid deciles is observed in Australia, with its means-tested system, in Canada, the Netherlands and the United Kingdom, with predominantly flat-rate public schemes and in the United States, where the public pension plan has a 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 proportions of pensioners at the very bottom of the income distribution, but rather fewer with incomes in the top half of the population distribution.

Figure 10 shows the pattern in Japan and New Zealand, but unlike Figure 9, incomes have not been adjusted for the size of family unit. The absence of equivalization makes the results difficult to interpret. New Zealand shows a similar pattern to countries such as Australia, Canada, the Netherlands and the United Kingdom, with the exception of a greater proportion of pensioners in the bottom income decile. This is to be expected as the public pension program in New Zealand is flat-rate. Japan shows a greater degree of concentration of pensioners in the poorest groups than any of the counties above. In both cases, the results would probably look very different if incomes were equivalized.

Figure 10. **Percentage of pensioners in each decile of the population income distribution in Japan and New Zealand, unequivalized**
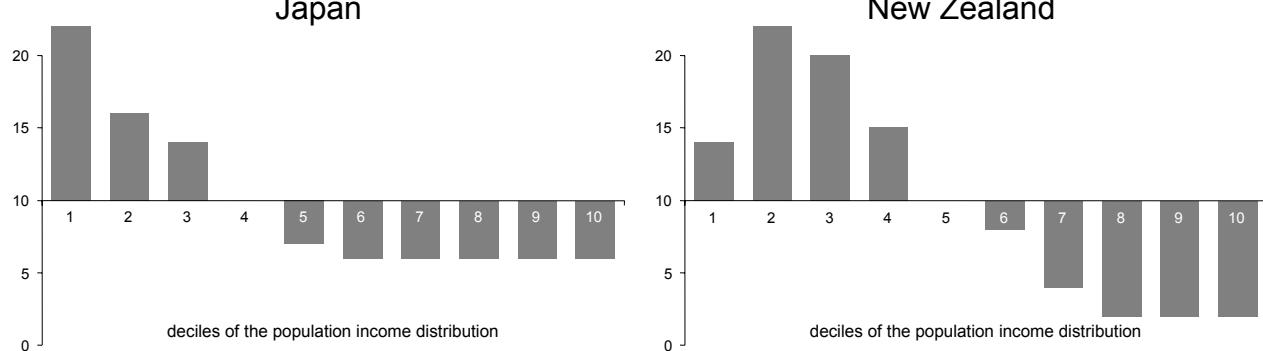
Source: Johnson (1999), Table 4.7A based on StJohn (1998) and Yashiro (1997)
Note: these charts are not comparable with Figure 9 because household incomes have not been adjusted for different household compositions ('equivalized')

4.   Poverty

This section 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 section on measurement issues (section 1), 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 section 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'?

4.1   Poverty rates

The analysis of low incomes begins with three studies that measure poverty of the elderly as the proportion of pensioners with incomes in the bottom quintile of the population income distribution. Figure 11, from Johnson (1999), summarizes the more complete data from Figure 9. The intercept of the chart is now drawn at 20 per cent: 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, but in five countries, fewer than one in five pensioners are in the bottom quintile.

Figure 12 shows the same poverty measure from an OECD study. In this paper, the elderly in all 11 countries shown are over-represented in the bottom quintile of the income distribution. Most striking is the difference between the results for Australia in Figures 11 and 12 and the extremely high poverty rates reported for most of the Nordic countries (Denmark, Finland and Norway). One possible explanation is the relatively egalitarian population income distribution in the Nordic countries. While the incomes of the top 10 per cent in the United

States are around 6 times the incomes of the bottom 10 per cent, in the Nordic countries this ratio is under 2½. So while many more pensioners in Denmark are found in the bottom quintile of the income distributions, their incomes will be a higher proportion of the population average than low-income pensioners in the United States, where this poverty measure implies a smaller proportion of elderly that is poor.

Figure 11. **Pensioner poverty rates in eight OECD countries: percentage of elderly in the bottom quintile of the population income distribution**
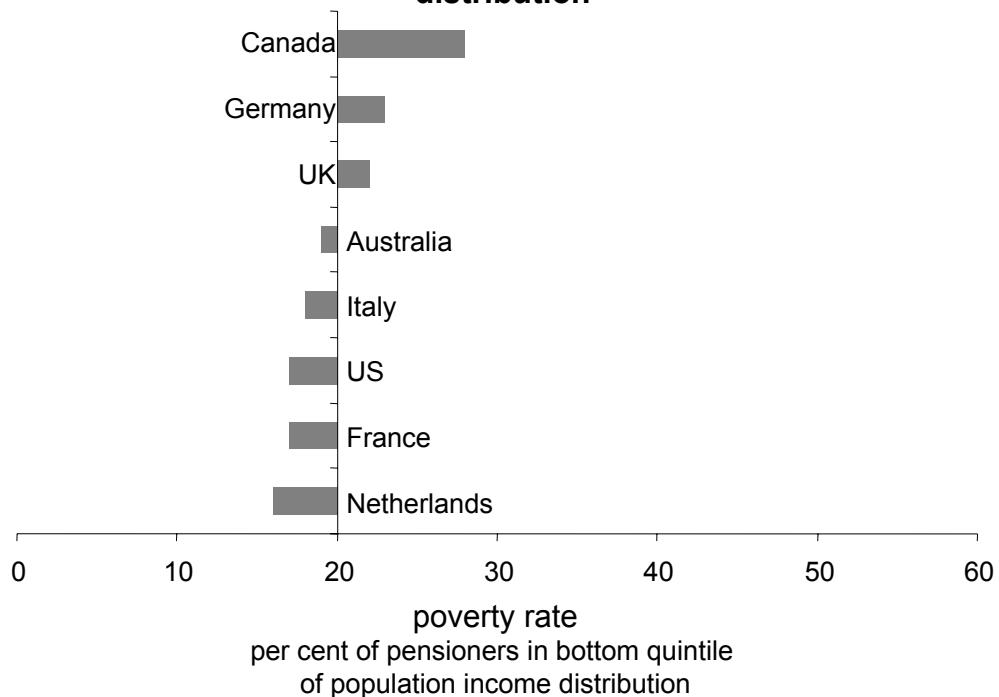
Source: Johnson (1999), Table I7

However, it is very difficult to reconcile these data with the results of other studies and with other results from this study. For example, it is hard to resolve the finding that the mean income of the elderly in Denmark is around three-quarters of the population average (Figure 2) with the result that 60 per cent of Danish pensioners are in the bottom quintile of the population income distribution. Comparing the data in Figure 12 with Figure 11, the correlation coefficient of –0.08 for the six common countries shows that measured poverty rates are completely unrelated between the two studies.

Figure 12. **Pensioner poverty rates in 11 OECD countries: percentage of elderly in the bottom quintile of the population income distribution**

poverty rate
per cent of pensioners in bottom quintile
of population income distribution
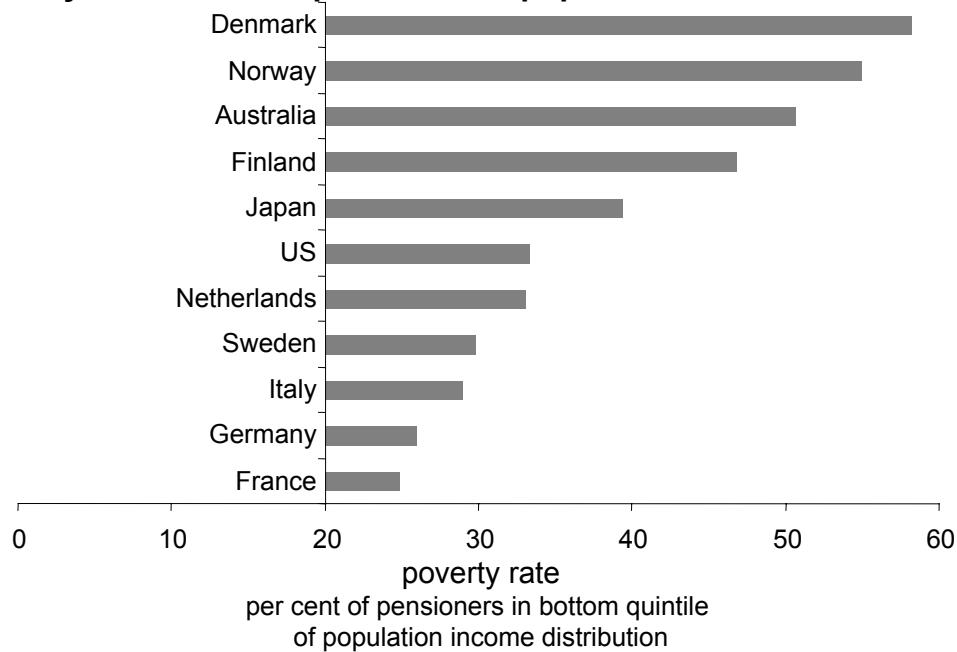
Source: Burniaux *et al.* (1998), Table 5.3

Figure 13 shows pensioner poverty rates in 14 Latin American countries. Comparing these results with Figure 11 shows lower poverty rates among the Latin American elderly than those in OECD countries. Indeed, in Chile and Brazil, poverty rates are well under 10 per cent, meaning that pensioners are under-represented among the poor by a rate of more than 50 per cent. Even in the three countries — Costa Rica, Ecuador and Honduras — where the elderly are over-represented among the poor, the degree of over-representation is lower than in some OECD countries.

Other international studies have used an alternative threshold for poverty to the bottom quintile of the population income distribution. Figure 14 defines poverty as 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 will record higher poverty. But 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.

Figure 13. **Pensioner poverty rates in fourteen Latin American and Caribbean countries: percentage of elderly in the bottom quintile of the population income distribution**

poverty rate
per cent of pensioners in bottom quintile
of population income distribution
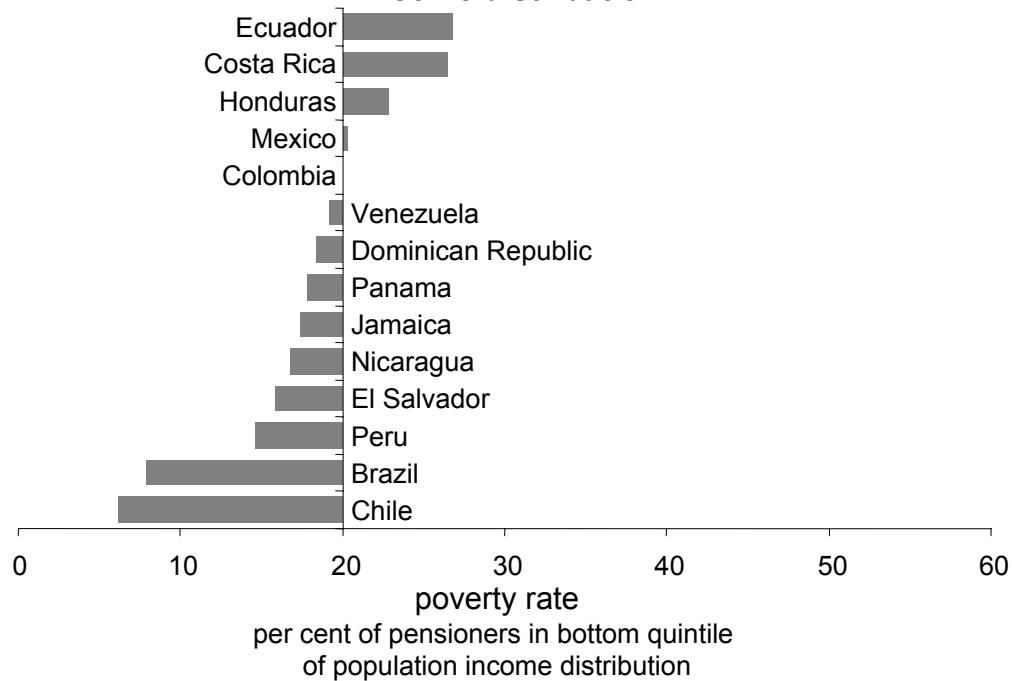
Source: Inter-American Development Bank (1999), Table 4.1

The pattern of countries is again very different from the two previous studies of OECD countries. There are six countries common to Hauser's paper (Figure 14) and the OECD secretariat's results (Figure 12). The correlation coefficient of the poverty measures is –0.46, suggesting a reasonably strong relationship, but a *negative* one: countries with high poverty rates in Figure 14 tend to have low measured poverty rates in Figure 12 and *vice versa*. The correlation with Johnson's results (Figure 11) for the seven common countries is –0.15, implying no significant relationship between the two studies. However, it is easier to rationalize the differences between Hauser's results and the other two papers on OECD countries — because of the difference in poverty measures — than it is to explain the conflicting results of Johnson and Burniaux *et al.* Nevertheless, even if differences in methods are responsible for the different results, the conclusion is still worrying. Since each method of measuring poverty — thresholds of the bottom quintile and proportions of average income —

has its own advantages and disadvantages, these conflicts imply that it is very difficult to compare pensioner poverty rates cross-nationally.

Figure 14. **Pensioner poverty rates in 14 OECD countries: proportion of pensioners with incomes below half population mean**

proportion of pensioners
with incomes less than 50 per cent of population mean
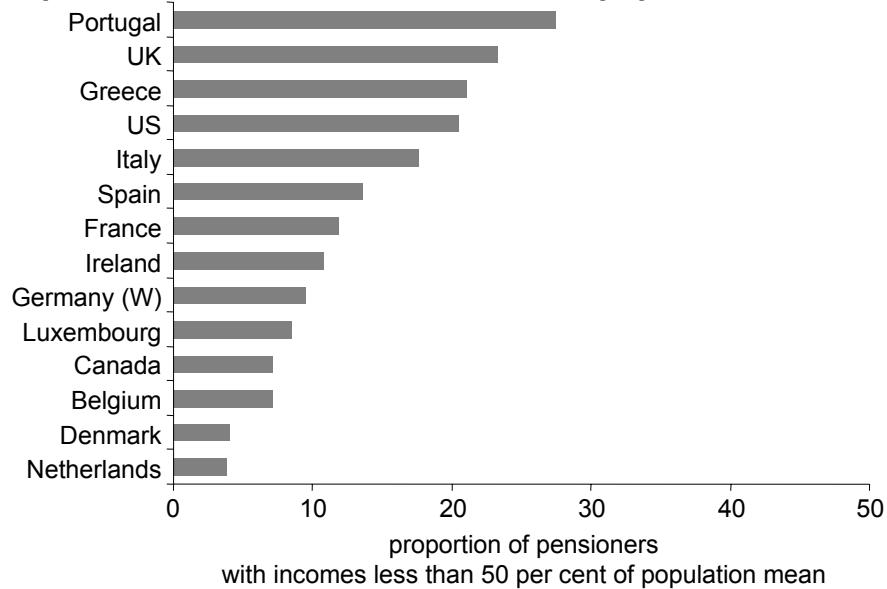
Source: Hauser (1998), Table 6

Figure 15 presents results for a range of 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 with the different poverty lines. In the United Kingdom, for example, nine per cent of pensioners have incomes less than 40 per cent of average, the fifth highest proportion. But 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 15. **Pensioner poverty rates in 14 OECD countries: proportion of pensioners with incomes below specified proportions of population mean**
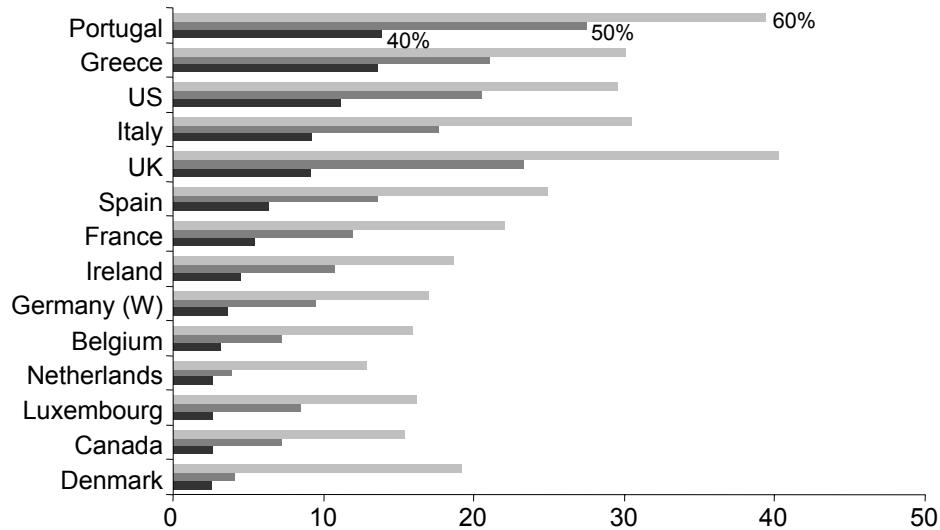
Source: Hauser (1998), Table 7

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

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

Figure 16 presents a similar analysis for a broader range of countries, including Hungary, Poland, Russia and Taiwan. Again, the results are not especially sensitive to the choice of poverty threshold over this range. The correlation matrix of the different measures is:

	40%	50%	60%
40%	1	—	—
50%	0.81	1	—
60%	0.62	0.93	1

There are again few major re-rankings. The main one is Australia, which has the highest proportion of pensioner with incomes under 60 per cent of average but only the fifth highest measured poverty rate with a 40-per-cent threshold.

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Figure 16. **Pensioner poverty rates in nine countries: Percentage of over 65s with incomes below various percentages of population median income**
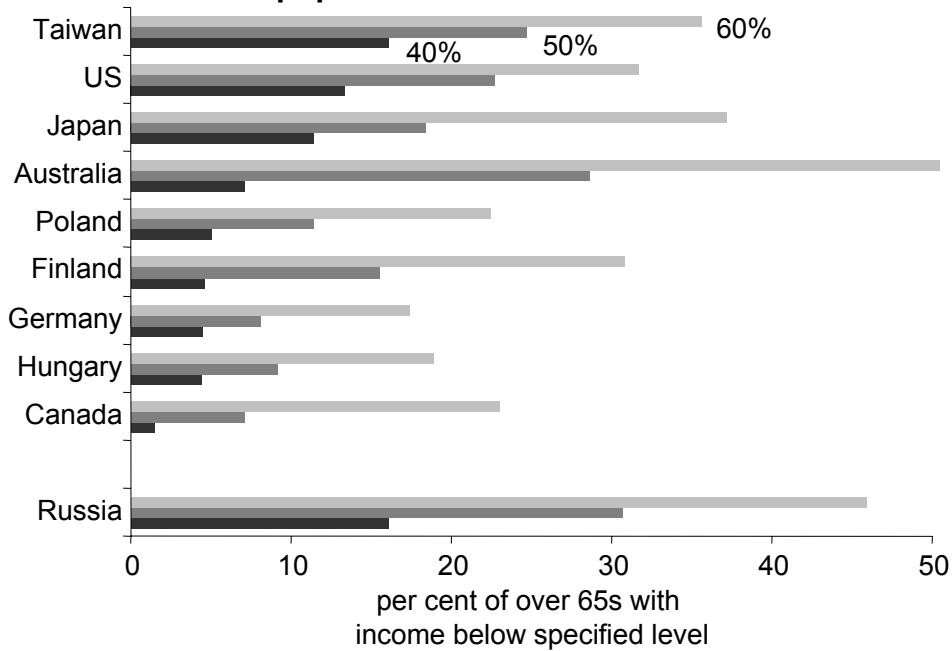
Source: Smeeding and Saunders (1998), Table 2 and Kazakov (1997)

4.2 *Poverty shares*

A second presentation of poverty data is to look at the proportion of the poor that is elderly, rather than the proportion of the elderly that is poor as in the poverty rates above. The two measures, along with the pensioner share in the total population, are closely related.

Figure 17 shows the pensioner poverty share from the OECD secretariat's study. The poverty shares are fairly closely related to the poverty rates measured from the same study: the correlation coefficient is 0.81. But there are some differences. Sweden and Australia, for example, both have pensioner poverty shares of around a quarter. But the pensioner poverty rate is 30 per cent in Sweden and over 50 per cent in Australia. The difference, of course, arises from the difference in population shares. Since there are relatively fewer pensioners in Australia (one of the youngest OECD countries) than Sweden (one of the oldest), the higher poverty rate in Australia translates into a lower poverty share. Unfortunately, it is not possible to produce a similar analysis based on the other studies of OECD countries.

Figure 17. **Pensioner poverty share in 11 OECD countries: pensioners as a percentage of the bottom quintile of the population income distribution**

poverty share
pensioners as a percentage of bottom quintile
of population income distribution
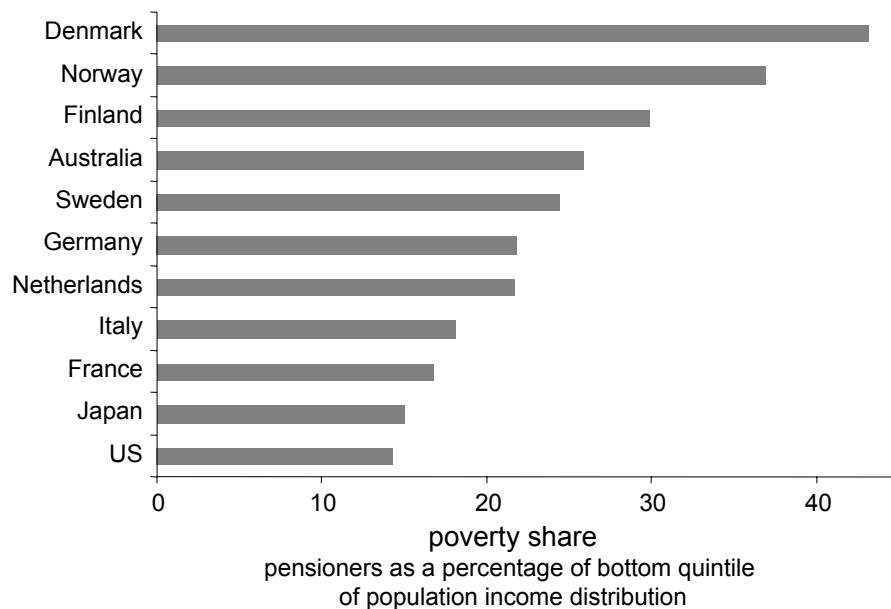
Source: Burniaux *et al.* (1998), Table 5.3

Figure 18 shows the same measure of poverty share for Latin American and Caribbean countries. Poverty rates (compare Figure 13 with Figures 11 and 12) are lower in Latin America, and most Latin American countries are currently younger than OECD countries. Pensioners make up only around 5 per cent of the poor in the fourteen countries shown. The maximum poverty share — less than 10 per cent — is lower than the minimum among the OECD countries. Indeed, the average elderly share of poverty in the OECD countries is 25 per cent.

Figure 18. **Pensioner poverty share in 14 Latin American and Caribbean countries: pensioners as a percentage of the bottom quintile of the population income distribution**


poverty share
pensioners as a percentage of bottom quintile
of population income distribution
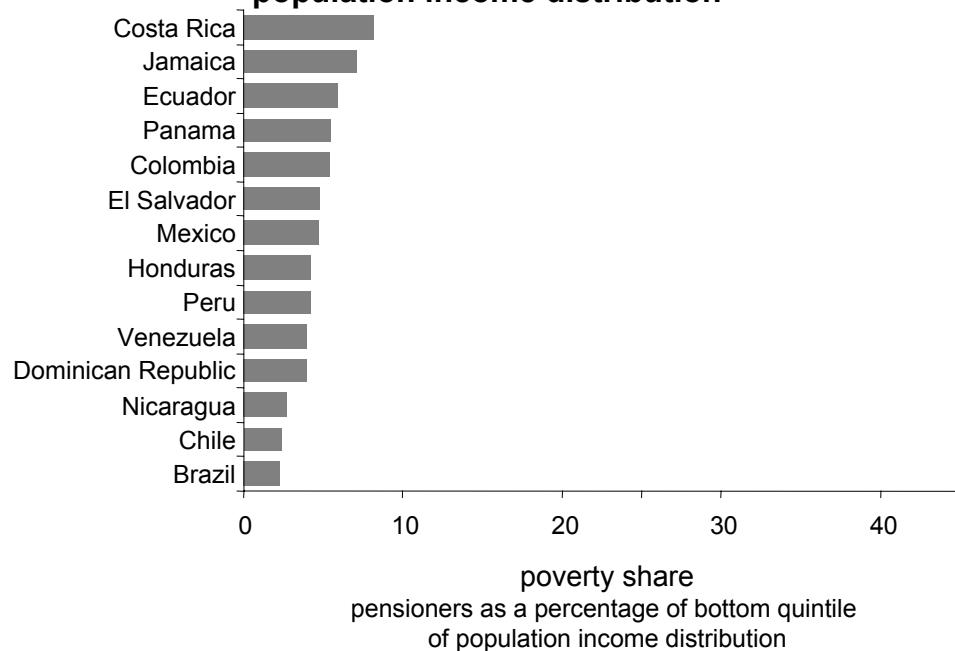
Source: Inter-American Development Bank (1999), Table 4.1

Table 3 gives poverty shares for Germany, Russia and the United States from Luxembourg Income Study data. In Germany, pensioners make up between 25 and 30 per cent of the poor using different poverty thresholds, broadly similar to their share of the total population. Pensioner poverty in the United States — between 20 and 25 per cent — is at or above the pensioner population share. In Russia, pensioners are over-represented among the poor with each of the three thresholds, but the share is less sensitive to the choice of poverty line than it is in the other two countries.

Table 3. **Pensioner poverty shares in Germany, Russia and the United States: over 65s as a percentage of people with incomes below various proportions of the population median income**

per cent of over 65s	under 40%	under 50%	under 60%	population
Germany	24.9	29.8	27.6	26.3
Russia	28.1	30.7	31.5	20.6
United States	19.9	23.6	24.4	19.9

Source: author's calculations based on Kazakov (1997)

Figure 19 presents poverty rates rather than poverty shares, but it gives both the elderly and the population poverty rate so it is similar in spirit to the poverty share analyses above. The poverty rates are rather higher than the numbers for other countries, but this is explained in part by the choice of a higher poverty threshold — two-thirds of the mean — than other studies. It is also based on expenditure rather than income, so people with high savings rates might be counted as poor here but not in the previous, income-based analysis. Poverty rates are generally higher in the former Soviet Union than in Eastern Europe. With the exception of Poland, the elderly have higher poverty rates than the population as a whole, with particularly broad margins in Bulgaria and Estonia.

Figure 19. **Percentage of households with elderly members and all households with expenditure below two-thirds of mean equivalent spending per adult in six Eastern European and Central Asian countries**
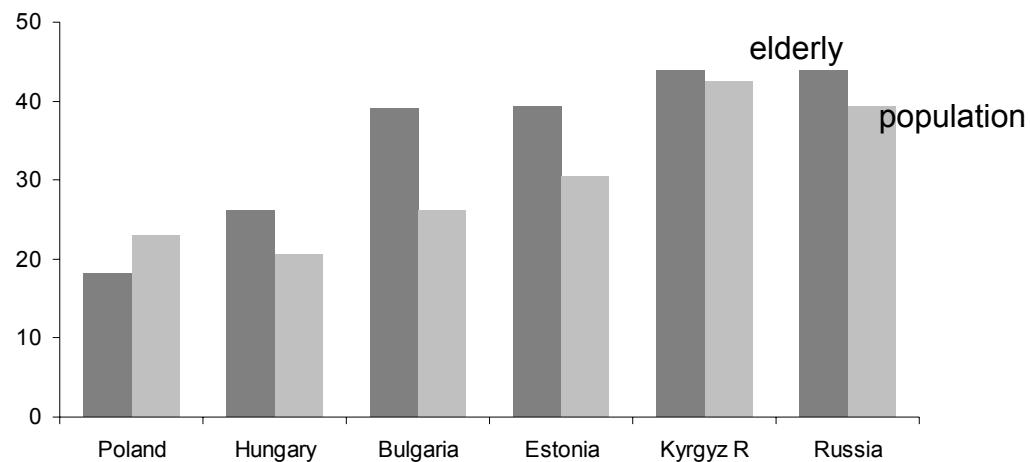
Source: Grootaert and Braithwaite (1998), Table 3

5.   Pensioner income inequality

This section focuses on the distribution of income among pensioners. Figure 20 shows a simple measure of income inequality: the ratio of the 90th percentile of the pensioner income distribution to the 10th percentile, 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 reflects the more dispersed distribution

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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 20. **Pensioner income inequality in eight OECD countries: ratio of 90th percentile of pension income to 10th percentile, couples**
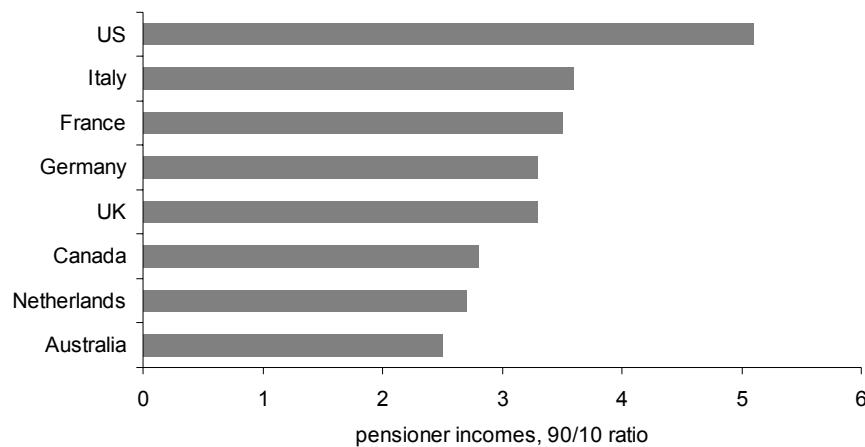
Source: Johnson (1998), Table 4.3

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 21 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.

Figure 21a. **Pensioner incomes as a percentage of non-pensioner incomes by income quintile in six OECD countries**
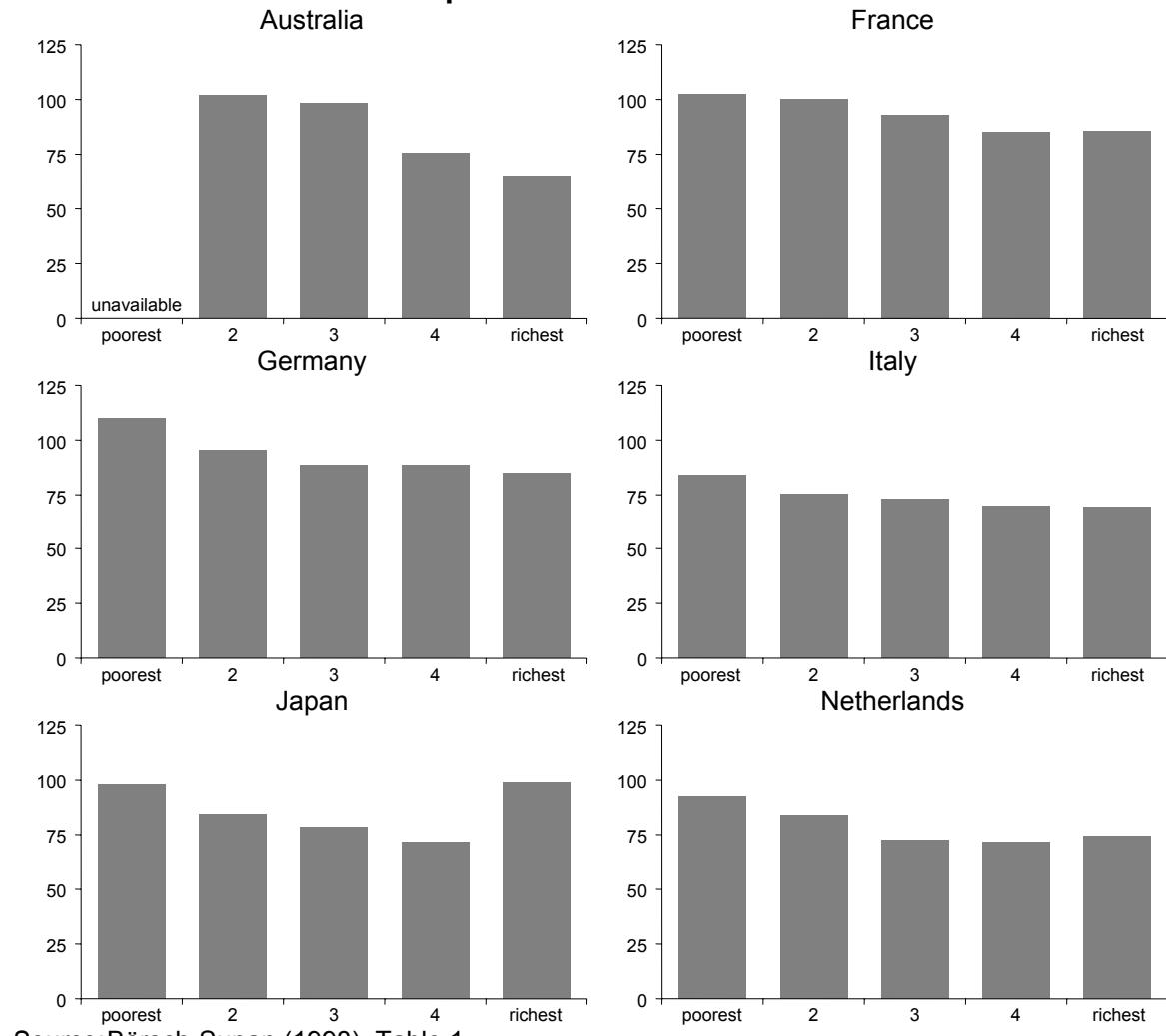
Source: Börsch-Supan (1998), Table 1.

Figure 21b **Pensioner incomes as a percentage of non-pensioner incomes by income quintile in three OECD countries**
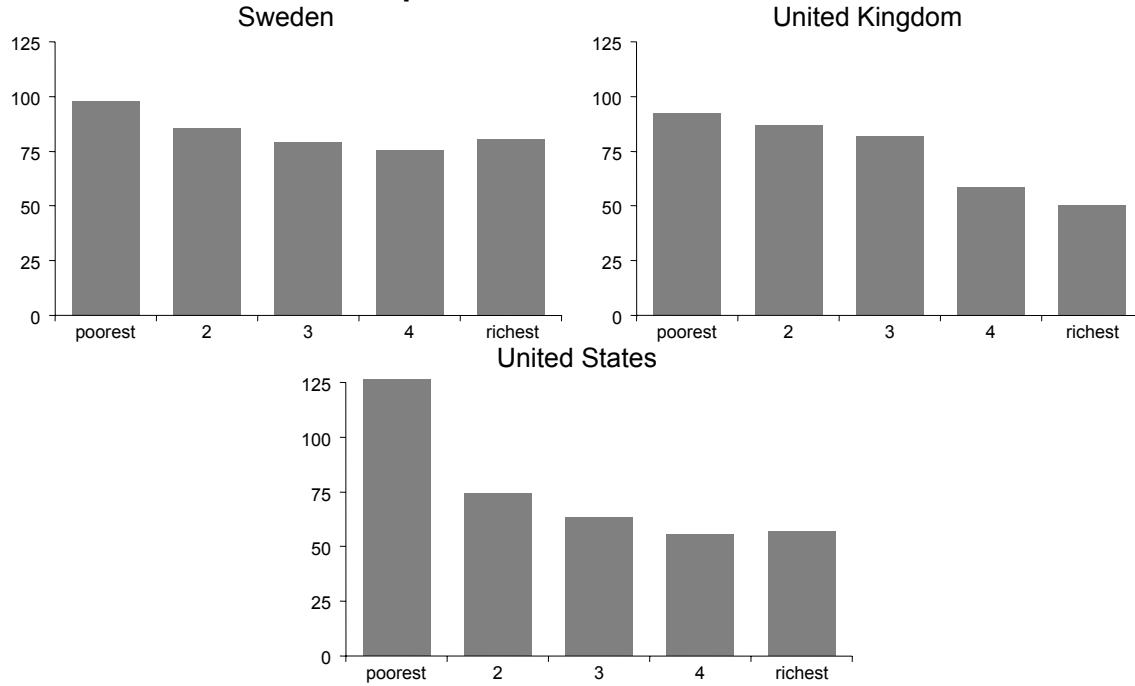
Source: Börsch-Supan (1998), Table 1.

6.   Income trends

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

6.1   Trends in pensioner incomes: mid 1970s to early 1990s

Figure 22 is based on three years' data drawn from the Luxembourg Income Study. Generally, the first year is in the mid 1970s, the second around 1980 and the third in the early-to-mid 1990s. In all countries bar the United Kingdom, pensioners' incomes have grown significantly faster than the incomes of the population as a whole. 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 1 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

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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.

Figure 22. **Income trends in Canada, Sweden, the United Kingdom and United States: median incomes of the elderly relative to the population median**
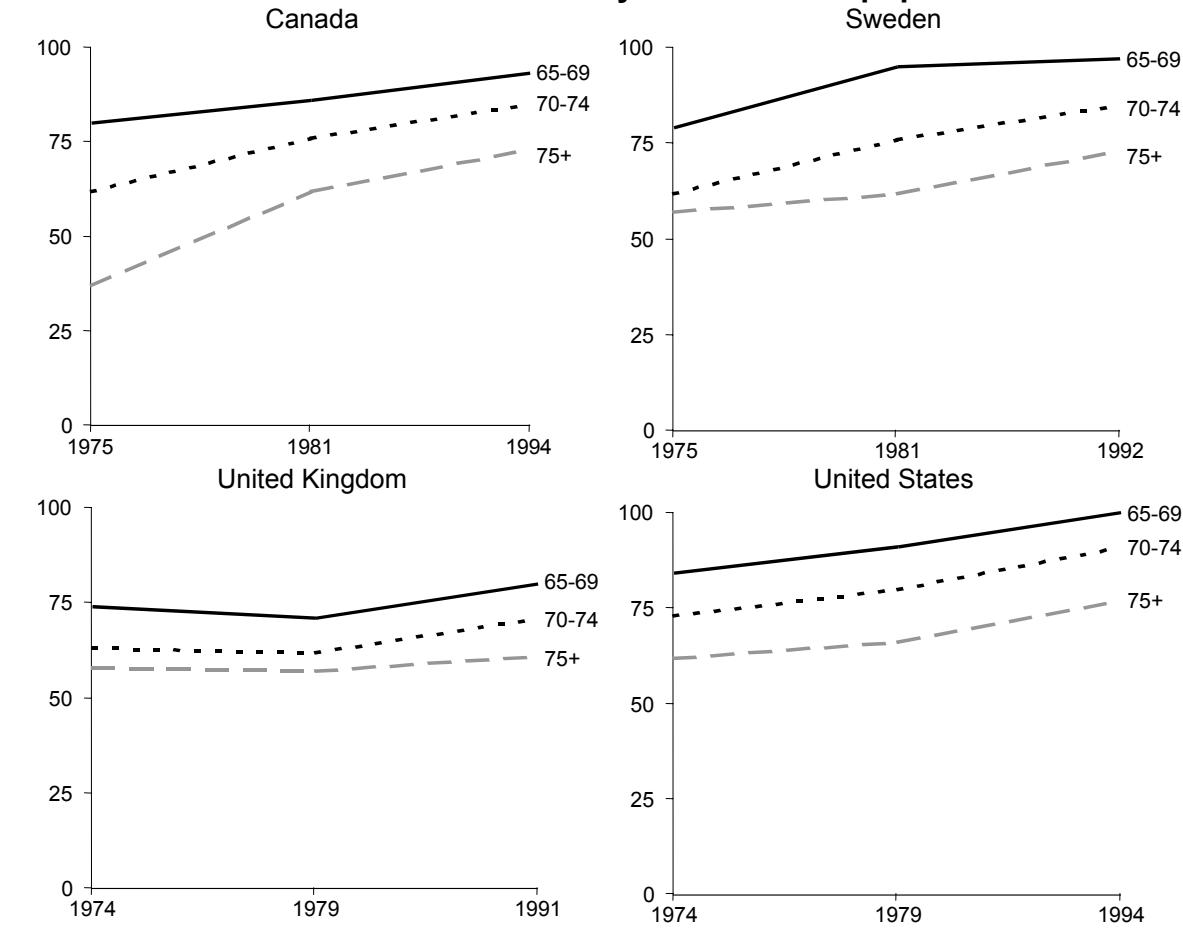
The United Kingdom shows a different pattern, with pensioner incomes increasing at the same rate or slightly slower than the population average in the late 1970s. During the 1980s, however, pensioners of all age groups gained ground, with incomes rising 65-74 year olds increasing 1 per cent a year faster 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.

Figure 23 shows the growth rate of pensioner incomes relative to population incomes. The trend of increasing relative incomes of the elderly found in Figure 22 is shown to be common to many OECD countries. The only exceptions are Australia, Japan and the Netherlands, where the relative incomes of the elderly fell.

Figure 23. **Annual change in pensioner incomes relative to population mean in 11 OECD countries, per cent of initial proportion**
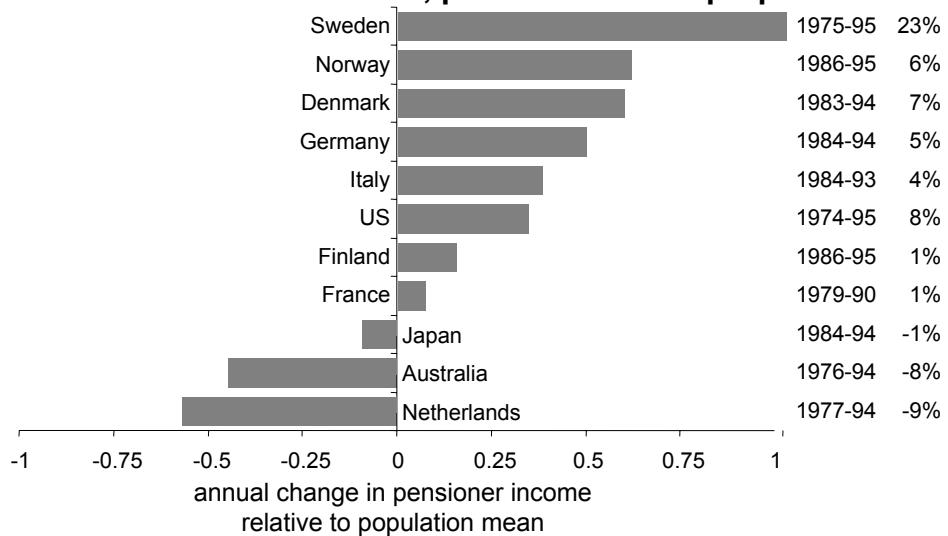
Source: Burniaux et al. (1998), Table 4.2
Note: numbers to the right of the Figure give the total growth rate and the period to which this refers. The bars show the annual growth rate derived from these data

Box 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 official pensioner income statistics seems to contain an odd paradox. Both pensioner couples' and single pensioners' incomes were 59 per cent higher on average in 1996-97 than they were in 1979, but pensioners' incomes as a whole grew by 62 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 58 per cent (Department of Social Security 2000*a*, Tables A1, A1-supplementary and A4). 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 incomes from 1979 to 1996-97 was 73 per cent: adjusting for compositional changes, the growth rate is 69 per cent.

This, of course, raises another compositional effect in time series comparisons: the aging 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 poverty rates: mid 1970s to early 1990s

Figure 24 shows that the widespread increase in pensioner prosperity found in Figure 22 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 poverty in the late 1970s were partially reversed in the 1980s. But 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 24. **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**
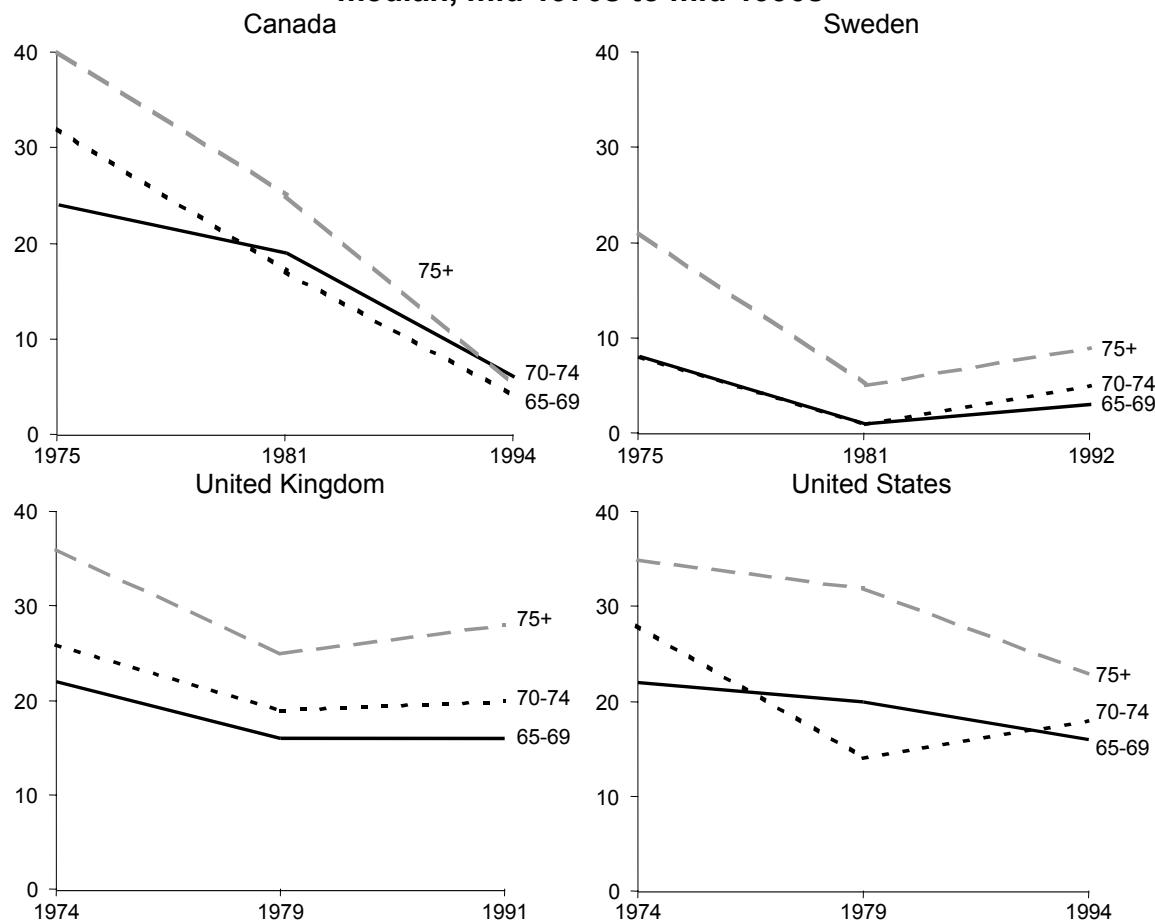
Source: Smeeding and Sullivan (1998*a*), Appendix Table 1

Longer-term studies show an even more remarkable change in pensioners' relative prosperity. The Bureau of the Census found 35 per cent of pensioners were poor (relative to the national poverty line) in 1959. This had fallen to 12 per cent by 1991. In the United Kingdom, Rowntree and Lavers (1951) estimated that two-thirds of pensioners in York had incomes below a subsistence minimum. This compares with only a quarter or so currently falling below a much higher poverty line.

Figure 25 focuses on the United Kingdom. It shows pensioners' position in the overall income distribution at the end of the 1970s and in the mid 1990s. It is similar to the cross-national picture shown in Figure 9, but here the population is divided into fifths (quintiles) rather than tenths. In 1979, almost half of pensioners were in the poorest fifth of the population. But by 1995-96[39], this proportion had nearly halved and pensioners were only marginally over-represented in the bottom quintile.[40] The proportion of pensioners falling into each of the four richer quintiles increased. This confirms the cross-national results: pensioners as a whole did better than the population as whole, but gains were particularly concentrated at the bottom of the income distribution: the incomes of the poorest pensioners increased much more quickly than the incomes of the poorest people of working age.

Figure 25. **Pensioners' position in the population income distribution in the United Kingdom, 1979 and 1995-96**
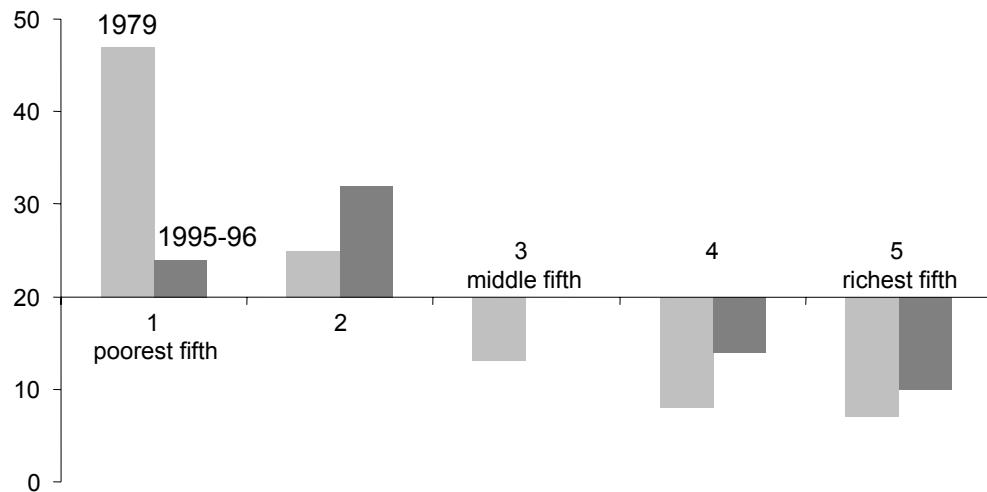
Source: Department of Social Security (2000*a*), Table A.15 and Figure 16

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[39]   Figures from a different dataset — the Family Resources Survey rather than the Family Expenditure Survey — find a similar pattern in 1997-98. Department of Social Security (2000), Table 15.
[40]   Goodman and Webb (1995) report that the pensioner share of the bottom quintile of the income distribution remained broadly constant in the 1960s and 1970s.

Box 3. **Income and consumption based measures**

The advantages and disadvantages of expenditure as a measure of welfare were set out in section 1.4. This box 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 1960s, 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 expenditure decile. 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, with the proportion of the old in the bottom spending decile increasing 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 section 5.

Continuing with the focus on the United Kingdom, Figure 26 compares incomes across a thirty-year period: from 1961-62 to 1991-92. The left-hand bar shows how much higher the incomes of the poorest 10 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 3½ per cent as year in the 1960s and 2¾ per cent a

year in the 1970s. The richest pensioners at the end of the 1960s were only 10 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 4½ per cent a year, the median by less than 2½ per cent a year and the bottom decile by just 1 per cent a year. \

Figure 26. **The changing pensioner income distribution in the United Kingdom, 1961-92**
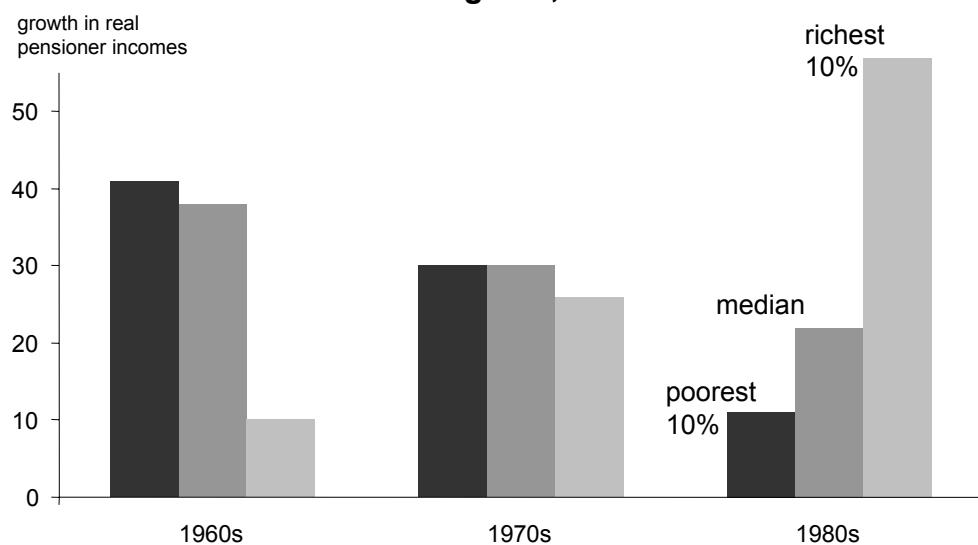
Johnson and Stears' (1995) results are confirmed by more recent official data. The Department of Social Security (2000*a*) estimates that the top quintile of pensioners had 80 per cent higher incomes in 1996-97 than their counterparts in 1979, an annual growth rate of 3½ per cent. The bottom quintile grew by 34 per cent over the same period, equivalent to a little under 1¾ 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.

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 4 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 the same as at the beginning. But the distribution narrowed again in the 1990s.

Table 4. 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 5 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 5. Characteristics of the poor in Australia, 1972-73 and 1996

per cent	1972-73	1996
Old	46	29
Working age		
Out of labor force	27	29
In labor force	27	42

Source: King (1998)

6.4 Pensioner incomes during the transition to a market economy

Figures 27 and 28 show how the value of public pensions changed relative to wages during the economic transition. Figure 27 looks at four Eastern European countries. In all bar Hungary, replacement rates increased between 1989 and 1991 as real wages fell. Later, replacement rates fell back again. In the Czech and Slovak Republics and Hungary, they were lower in 1996 than they had been in 1991, at around 60 per cent. In Poland, however,

pensioners' early large gains relative to earnings were consolidated, and at the end of the period, pensions averaged over 70 per cent of wages compared with 55 per cent in 1989. So Polish pensions increased on average by 4 per cent a year faster than earnings over the seven-year period.

Figure 27. **Pension replacement rates during the transition: Poland, Hungary, Czech and Slovak Republics 1989-96, based on national-accounts data**
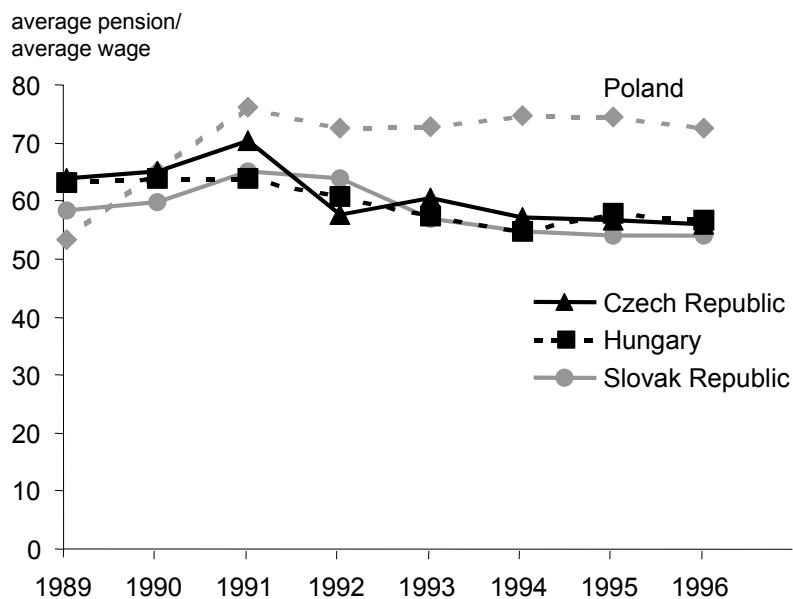
Source: Schrooten, Smeeding and Wagner (1998), Table 2

The time-series in Russia (Figure 28) is extremely volatile because of the generally high level of inflation and the periodic changes in benefits to reflect changing living standards. Indeed, replacement rates vary enormously even when measured month by month. The general trend, however, is rather different from the pattern in Eastern Europe. The average pension has declined slightly and the minimum pension declined rapidly relative to earnings. The average replacement rate — in the mid 30s — is nearly half the replacement rate in Eastern Europe.

Figure 28. **Pension replacement rates during the transition, Russia 1985-93**
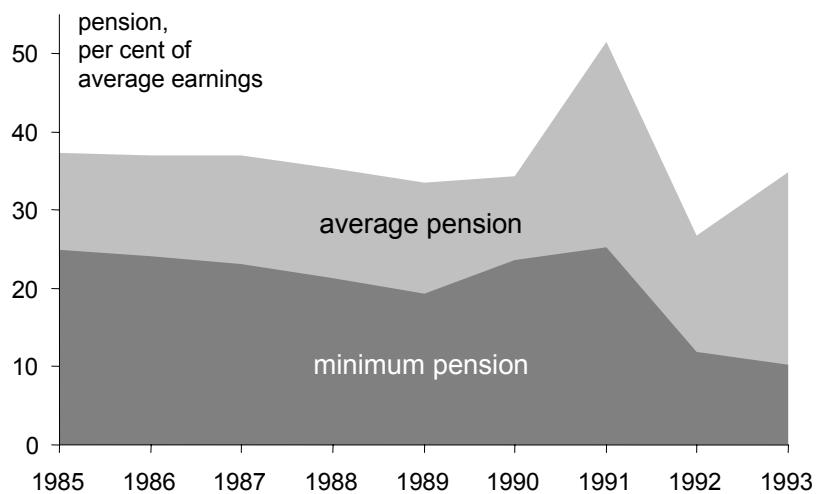
Figure 27 was based on national-accounts data, and so it does not capture all sources of incomes of pensioners. It also compares gross pensions with gross earnings, and so ignores the effects of the personal income tax. Table 6 uses household-survey data to compare replacement rates in three Eastern European countries in the mid-to-late 1980s and the early-to-mid 1990s. The first result of note is that including all pensioners' income sources and taking off tax payments substantially increases the measured replacement rate. Indeed, in Poland and Hungary, average pensioners' incomes are close to or even in excess of the population average. Secondly, replacement rates grew strongly in all three countries, a pattern that did not emerge from Figure 27.

Table 6. **Median income of over 60s as a percentage of population median income, Czech Republic, Hungary and Poland**

per cent	Czech Republic		Hungary		Poland	
	1988	1992	1987	1994	1986	1995
All	72	85	81	95	77	104
Single	58	75	72	85	—	96
Couples	80	87	—	103	—	107

7.   Income sources

This section 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.

7.1   OECD countries

Figure 29 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. But in other countries, there is a large gap. In Australia, Japan, the Netherlands, the United Kingdom and the United States, private pension incomes are particularly important (see Table 7). In Italy, the elderly are more likely than in other OECD countries to live with their children or other relatives.

Figure 29. **Ratio of pensioners' transfer and total incomes to older workers' incomes in nine OECD countries, couples**
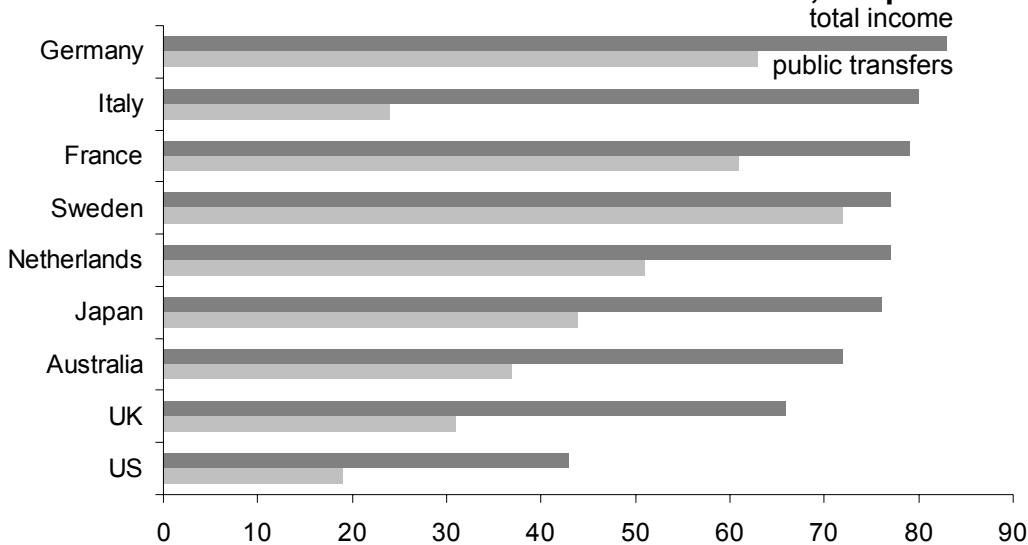
Source: Disney, Mira d'Ercole and Scherer (1998), Figure 1
Note: compares income of households where the head is aged *circa* 67 with households where the head is *circa* 55

Figure 30 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 elderly's income comes from public pension programs.

Table 7. **Percentage of pensioners with income from employer-provided pensions in eight OECD 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 31. The differences between the two are probably accounted for by the different samples (Figure 31 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. Also, the decline in the role of the state with income is much more pronounced in the United Kingdom.

Figure 30. **Percentage of pensioners' income from public pensions and other state benefits in nine OECD countries, by quintile of the income distribution**
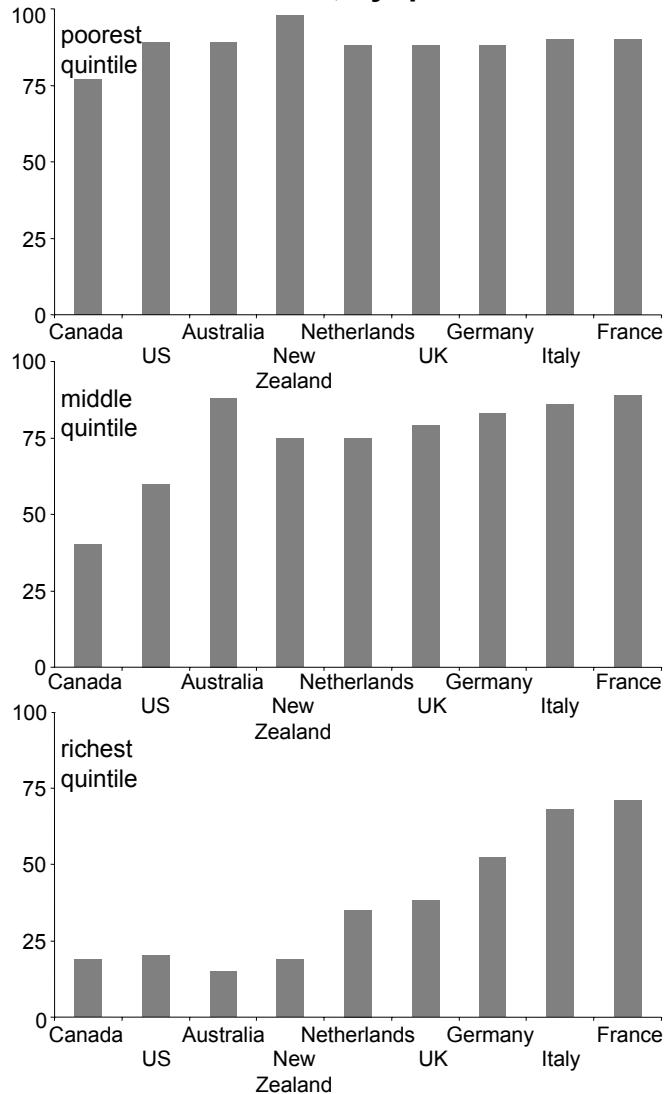
Source: Johnson (1998), Table 4.4

Figure 31a. **Percentage of pensioners' income from public pensions and other state benefits in two OECD countries, by income quintile**
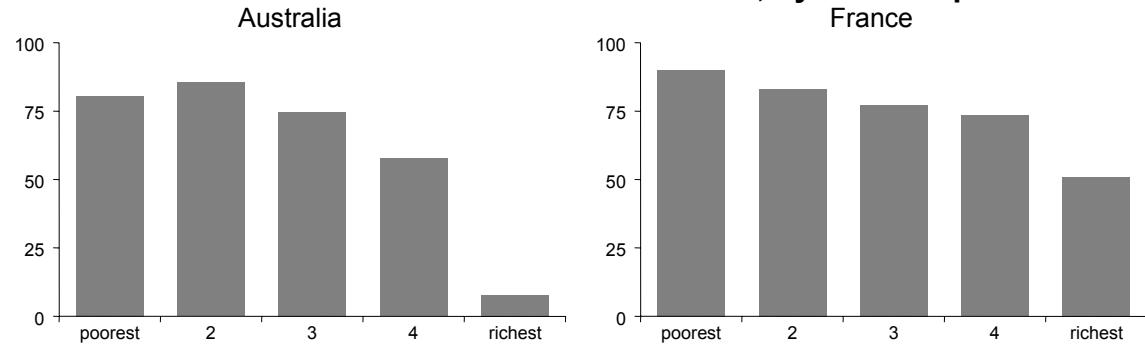
Source: Börsch-Supan (1998), Table 2

Figure 31b. **Percentage of pensioners' income from public pensions and other state benefits in seven OECD countries, by income quintile**
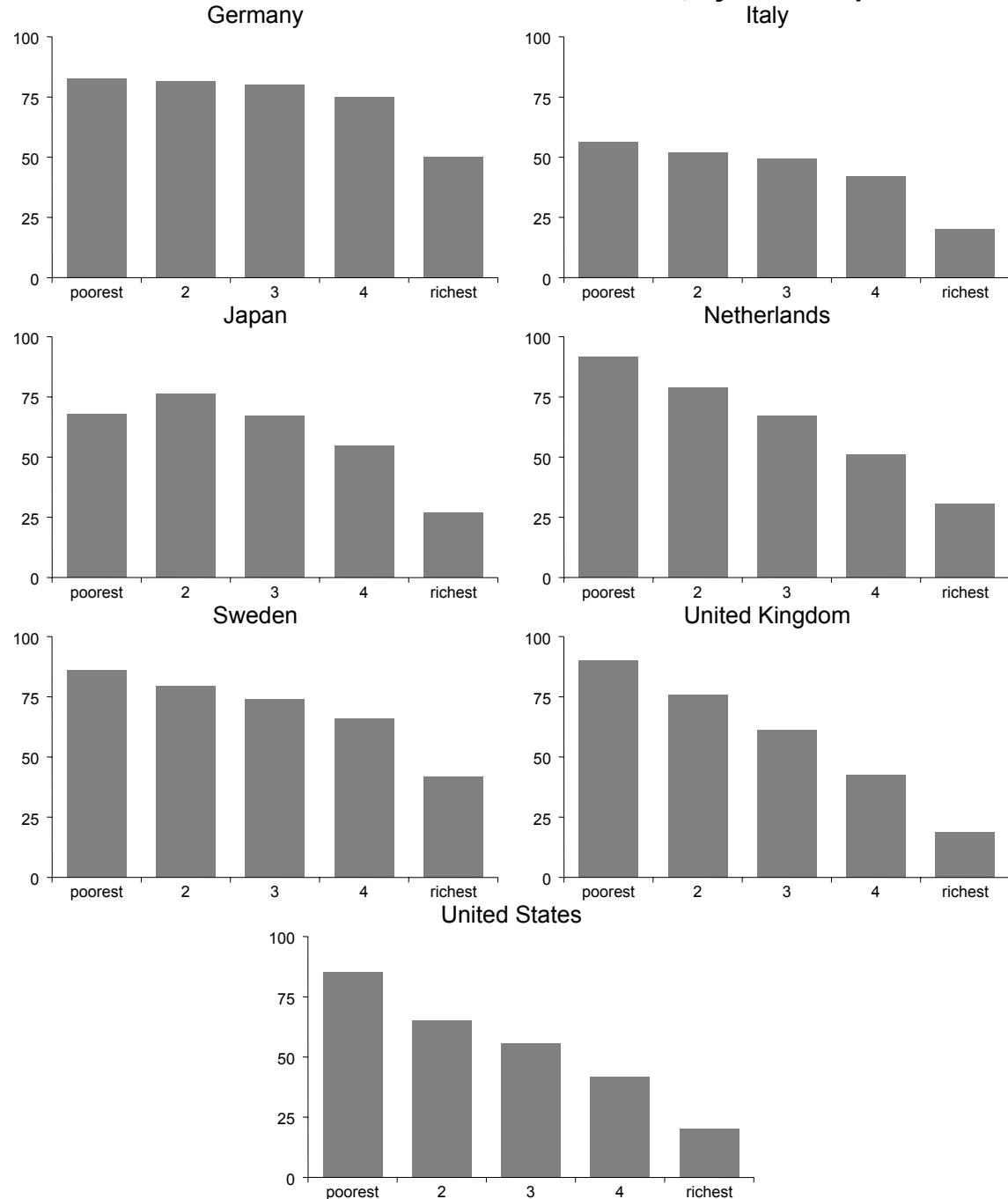
Source: Börsch-Supan (1998), Table 2

7.2 Latin America

Figure 32 shows a more diverse pattern of income sources than in OECD countries. Public pension benefits play only a small in the Dominican Republic, Paraguay and Bolivia, although other transfers, such as social assistance, are quire important. In these countries, it appears that many of the elderly are forced to continue to work, with nearly half of the over 65s' income coming from earnings in the Dominican Republic. At the other end of the spectrum, Argentina, Uruguay and Panama (and perhaps Brazil) show a similar level of state involvement in providing old-age incomes as in the OECD.

Figure 32. **Percentage of over 65s' income from different sources in eight Latin American countries**
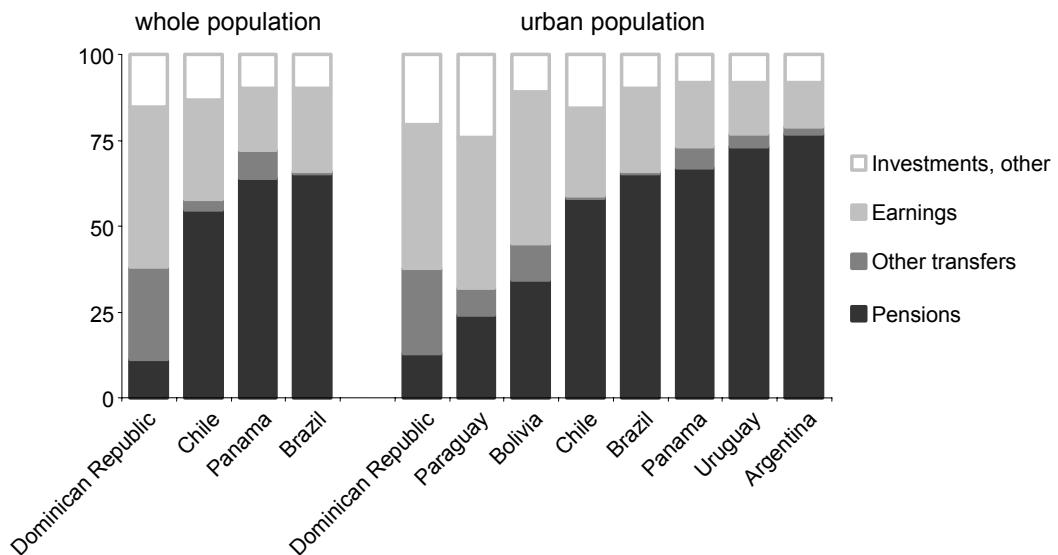
Source: Inter-American Development Bank (1999), Table 4.3

Breakdowns of income sources are available for different income levels for four of these countries. Public pensions reach very few people in the Dominican Republic either in the population as a whole or at the bottom of the income distribution. In Chile, pensions play a similar role for the poorest pensioners as for all the elderly, but, as would be expected, other transfer incomes play an important role for the poorest while investments are more significant for the rest. The pattern in Panama is very striking. The state provides a similar proportion of income, but the richer old receive this in the form of public pensions while the poorer old rely on other public transfers. Brazil and Chile are perhaps closest to the pattern in OECD

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countries, with at lesser but still large role for the state in providing incomes for the richest pensioners. But this is a result of lower public pension benefits in Brazil and lower non-pension transfers in Chile.

Figure 33. **Percentage of income from different sources for the bottom quintile of over 65s and all over 65s in four Latin American countries, national population**
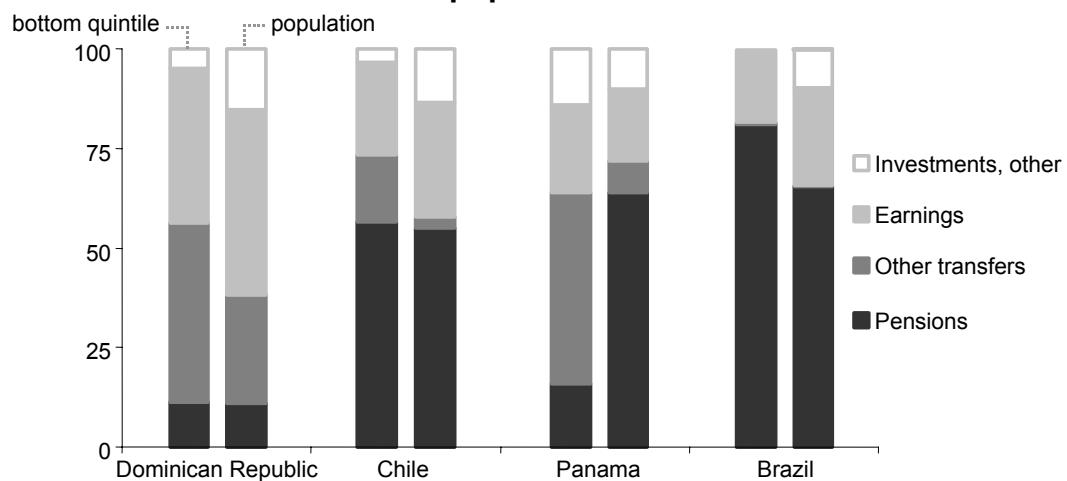
Source: Inter-American Development Bank (1999), Table 4.3
Note: countries are in the same order as Figure 32

Figure 34 carries out the same analysis for the broader range of countries for which there are data on the urban population alone. Argentina and Uruguay also exhibit a similar pattern to OECD countries. Bolivia stands out because the poorest over 65s receive virtually nothing in public pension benefits and only a small top-up from other public transfers. The picture in Paraguay is a more pronounced version of the pattern in the Dominican Republic. The poorest of the old receive a lot of help from the state, but in the form of non-pension transfers rather than public pension benefits. The principal explanation for the differences in the role of public pensions is the degree of coverage of these systems. Countries with less significant public pension systems tend (or have tended in the past) to have low rates of coverage and large informal sectors in the economy.[41]

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[41] See James (2000), Holzmann, Packard and Cuesta (2000) and Van Ginneken (1999) for a discussion of coverage issues.

Figure 34. **Percentage income from different sources for the bottom quintile of over 65s and all over 65s in eight Latin American countries, urban population only**
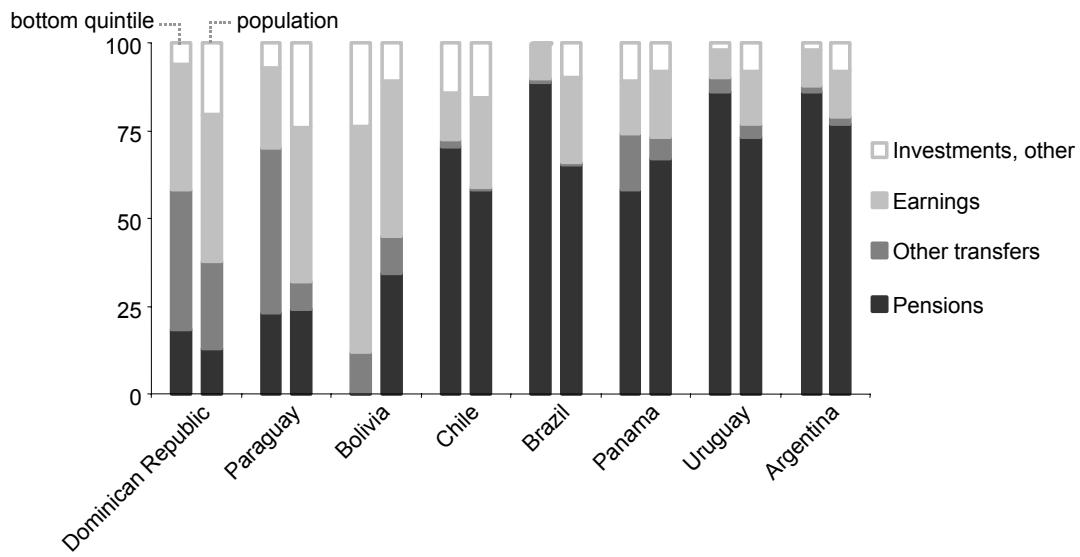
Source: Inter-American Development Bank (1999), Table 4.3
Note: countries are in the same order as Figure 32

7.3   *Changing sources of incomes over time: the United Kingdom*

Tables 8 and 9 analyze 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) and in other transfers (principally means-tested payments to help with housing costs and local taxes).

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. But 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.[42] Finally, the role of earnings continually diminished as labor-force participation of the elderly has declined.

Table 8. **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	51	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	19	19	15	16	14
Earnings or other	13	8	6	7	9	7

Source: Department of Social Security (2000*a*), Table A.1; Department of Social Security (2000*b*), Tables B1 and B3; Department of Social Security (1997), Table B2.01

Table 9. **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	53
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	9	7	8	8

Source: Department of Social Security (2000*a*), Table 1

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[42]   This raises a general problem with measuring investment incomes. Inflation rates were also high in the late 1980s and early 1990s, peaking at nearly 11 per cent. Part of the interest rates paid on deposits is compensation for inflation and so would be excluded from any standard, economic measure of income (see, for example, Kaldor, 1955; Pechman, 1980 and Whitehouse, 1999). So including nominal interest rates in incomes will bias both time series comparisons and cross-country comparisons when inflation rates vary.

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

8.1   Poverty dynamics

Figure 35 draws on an OECD study using six years of panel data for four countries. Poverty is defined as having an income below half of the population median. The chart shows the elderly share of the transitory poor — defined as people spending just one year in poverty[44] — and of the persistent poor — people who are in poverty in all six years of the data. The lines on the chart show the elderly's share of the population as a whole.

In Canada, the elderly are under-represented in the group of transitory poor while they form an almost exactly proportionate part of the permanent poor. In Germany and the United States, the elderly are disproportionately represented among both the transitory and the permanent poor. Figure 35 suggests that pensioner income mobility is less than for the working-age population, but that pensioners are far from income-immobile.

The data for the United Kingdom in Figure 35 are difficult to interpret because they are based on pre-tax incomes. Given that pensioners pay no social security contributions and have higher income tax allowance, their net incomes will be higher relative to non-pensioners'

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[43]   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).
[44]   This excludes people who spend the first or the last year of the six-year panel in poverty because there observations could mark the beginning or the end of a longer spell in poverty.

incomes. The chart therefore substantially overstates the proportion of pensioners in both transitory and persistent poverty. An earlier study — Jarvis and Jenkins (1996) — looked at the first four waves of the same survey as underlies the OECD paper, but based on disposable net incomes. They found that 24 per cent of single pensioners and seven per cent of pensioner couples were persistently poor for four years. This was marginally higher for single pensioners and marginally lower for couples than the proportion of pensioners that was poor in a single year (21 and 12 per cent respectively). Indeed, single and married pensioners made up 19 and 9 per cent respectively of the people who escaped from a low income over the four-year period. Particularly for married pensioners, this is only marginally less than the proportion that was poor in a single year.

Figure 35. **How long do the elderly poor remain poor?**
Proportion of households with a head over age 65 poor with incomes below half median for one year and for six years in four OECD countries
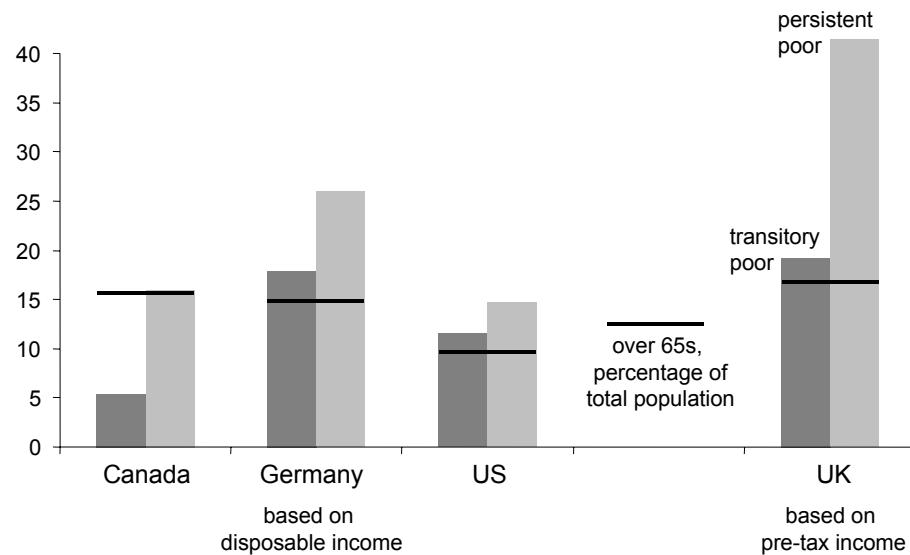
Source: Antolín, Dang and Oxley (1999)

Figure 36 shows the pattern of poverty over time in Russia using three years of panel data. Pensioner couples are shown to be highly under-represented in the group of permanent poor, and marginally less so in the transitory poor. For households with just one elderly person, the pattern is closer to the population as whole, with marginally fewer elderly among both the persistently and temporarily poor.

Figure 36. **Poverty dynamics in Russia: percentage of households with no, one and two or more elderly members with income below government poverty line for one, two or three years**

per cent of
individuals in
households

100

75   never poor

50

          transitory, one year

25
          transitory, two years

0   permanent
no elderly   one elderly   two or more elderly
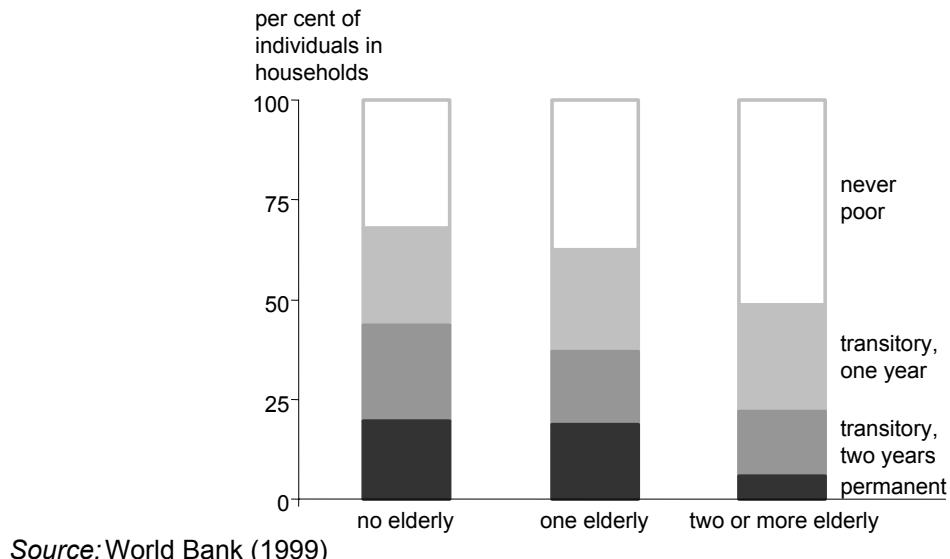
Source: World Bank (1999)

8.2   *Income dynamics*

Other studies have looked directly at changes in pensioners' incomes, rather than indirectly through poverty measures. Another dataset in the United Kingdom consists of surveys of a group of older people in 1988-89 and the same group in 1994. Figure 37 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.[45]

Interestingly, income changes over time were equalizing. 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.[46] Note that these changes relate to the same pensioners, unlike the results in the section on income trends.

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[45]   See Webb (1997) in addition to Johnson, Stears and Webb (1998).
[46]   Johnson, Stears and Webb (1998), Table 4. Incomes excluding earnings of men aged 65-69 in 1988-89.

Figure 37. **Change in pensioner incomes by sex and marital status in the United Kingdom, 1988-89 to 1994**
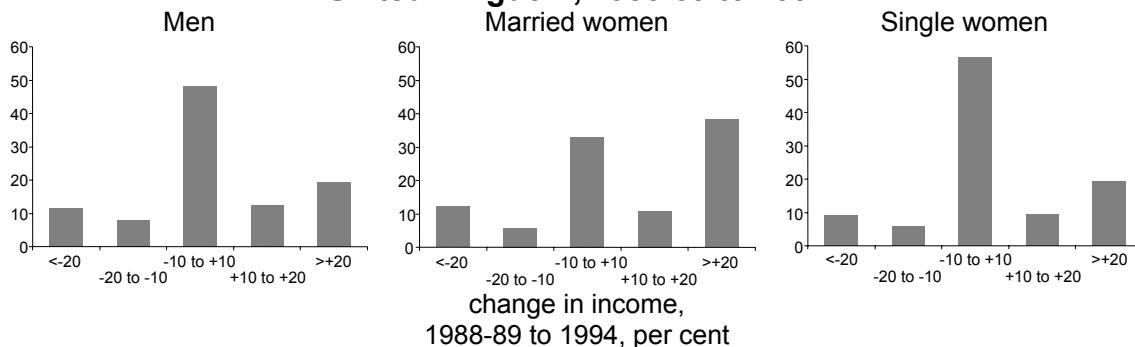
Note: 'single women' category includes never-married women and widows who were widowed before the first wave of the sample. Women who were widowed between the two survey waves are discussed below

8.3   *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.[47]

Women who were widowed between the 1988-89 and 1994 waves of the Retirement Survey had an average 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. 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).

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

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. It is simple to compare the ratio of the couple's income to the widows (175/127 = 1.38) with standard equivalence scales. This ratio is less than the scales described in Appendix B: 1.41 with an equivalence elasticity of 0.5 and 1.5 or 1.7 on the OECD scales. The benefits system in the United Kingdom assumes that a single person needs 60 per cent of the income of a couple to achieve the same living standards. On all of these scales, the widow can 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 therefore over 40 per cent higher for men who survived than men who died.[48] Also, 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.[49] This differential-mortality effect means that cross-section comparisons of incomes by sex and marital status should be interpreted with caution.

9.   Conclusions, preliminary policy implications and future developments

This paper has shown that pensioners fared well over the past two decades, improving their standard of living relative to the population as a whole. Although the absolute magnitudes vary from study to study, pensioners' incomes probably average around 80 per cent of population incomes. Nevertheless, the aging of the population could call into question whether the living standards of the elderly can be maintained, let alone improved in the future.

Although there remain pockets of poverty among the elderly, most studies show that the old are represented proportionally or under-represented among the poor. Poverty rates

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[48]   Studies have found a sizeable negative effect of widowhood on incomes in the United States: see, for example, Hurd (1989), Hurd and Wise (1989) and Burkhauser, Butler and Holden (1991). This has been attributed in particular to poor provision for survivors' benefits in private pensions.

have fallen over the past two decades, and the small number of longer-term studies show that improvements in the relative living standards of the elderly extend to the last five decades.

People of working-age, especially low-earning families with children, have recently tended to replace the elderly in the poorest echelons of society. Studies of income dynamics confirm the prior that the poor elderly are more likely to remain poor, while working-age people have more opportunities to move out of poverty. However, there is considerable income mobility even among the elderly.

The changing poverty profile should call into the question the structure of benefit systems that involve a significant transfer of resources from poorer working families to better-off pensioners.[50] Furthermore, there may be a role for greater targeting of help on the minority of poor old, either through direct means testing or indirectly, by focusing help on the oldest old or widows. The pressures of demographic aging, for example, might preclude general increases in pension benefits but there may be resources to help the poorest of the old.

Policymakers should be cautious before adopting the latter approach because the maturing of pension schemes and the effects of differential mortality make it easy to draw inaccurate conclusions about the causes of low incomes among these groups. Extra payments to the oldest old, for example, would meet an undoubted additional need, but because of the links between income, wealth and longevity, this would risk adding to the differential mortality bounty enjoyed by the richest of each date-of-birth cohort.

Outside the OECD countries — in both Latin America and Eastern Europe — there are even fewer poor pensioners. However, the situation in these regions could change in the future. Many of the poorest people in each cohort currently die before they reach pension age. As general life expectancy increases, more of these poorer groups will live beyond pensionable age, and so income patterns will probably change. The next stage of the Pension Reform Primer project on poverty, income distribution and the elderly will be to extend the analysis to a broader range of developing countries.

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[49]   Disney, Johnson and Stears (1998).
[50]   Social-security contributions, for example, are usually regressive (although sometimes they are proportional) and contribution rates have been rising to finance both increasing benefits for the elderly and increasing numbers of pensioners. See OECD (1997), chapter 5.

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* 65-59) 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 Actif Financiers	1994-95 1992	1 412 1 587	55-57 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 Retirement Survey	1988-89 1988-89	2 471 1 383	55-59 65-69
United States	Health and Retirement Survey Asset and Health Dynamics of the Oldest Old	1992 1993	2 206 2 153	51-61 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)

This report draws on a series of paper prepared by national experts and presented at a conference at the Institute for Fiscal Studies, London, March 1998. Table A.3 lists the contributors.

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

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

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.4 lists the data sources, Table A.5 the contributors.

Table A.4. **Datasets used in Burniaux *et al*., 1998**

	Survey	Years	Sample
Australia	Household Expenditure Survey	1975-76 1984 1993-94	9 700
Belgium	Ministry of Finance data from tax files	1983 1995	25 000
Canada	Survey of Consumer Finances	1975 1985 1990 1994	45 000
Denmark	Law Model database	1983 1994	1 in 30
Finland	Income Distribution Survey	1986 1995	12 800
France	Revenus Fiscaux	1979 1984 1990	33 000
Germany	Socio-Economic Panel	1984 1989 1994	4 600
Italy	Survey of Household Income and Wealth	1984 1991 1993	8 100
Japan	National Survey of Family Income and Expenditure	1974 1984 1994	60 000
Netherlands	Income Survey Income Panel Survey	1975 1985 1990 1994	75 300
Norway	Income Distribution Survey	1986 1990 1995	10 000
Sweden	Income Distribution Survey	1975 1983 1990 1991 1994	13 000
United States	Current Population Survey	1974 1979 1984 1989 1994	50 000

Note: Sample sizes refer to the latest survey year. The sizes given are the number of households except in Belgium, where the sample size is the number of individuals

Table A.5. **List of contributors to Burniaux *et al*., 1998**

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

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 Europäische Gemeinschaft) at the University of Frankfurt. They are discussed in Ahrens (1996) and Nitis (1996) respectively.

Table A.6. **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.7. **Data sources used in the Luxembourg Income Study**

	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
Czech Republic	Microcensus	1992	16 200
Denmark	Income Distribution Survey	1992	12 900
Finland	Income Distribution Survey	1991	11 700
Germany	Socio-Economic Panel	1989	4 700
Hungary	Income Survey	1991	2 000
Israel	Family Expenditure Survey	1992	5 200
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
Poland	Household Budget Survey	1992	6 600
Russia	Longitudinal Monitoring Survey	1992	6 400
Spain	Expenditure and Income Survey	1992	16 000
Slovak Republic	Microcensus	1990	21 200
Sweden	Income Distribution Survey	1992	12 500
Taiwan	Personal Income Distribution Survey	1991	16 400
UK	Family Expenditure Survey	1991	7 100
US	Current Population Survey	1991	16 100

A.5   *Antolín, Dang and Oxley (1999)*

This study is based on four panel datasets, which follow the same individuals and families over time.

Table A.8. **Datasets used in Antolín, Dang and Oxley (1999)**

	Survey	Years	Sample
Canada	Longitudinal Administrative Database	1990-1995	
Germany	Socio-Economic Panel	1991-96	16 000
United Kingdom	British Household Panel Survey	1991-96	5 500
United States	Panel Study of Income Dynamics	1988-1993	7 800

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

The United Kingdom's official pensioner income 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 collected 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 that the FES.

B. Equivalence scales used in different studies

The way in which households' gross incomes are adjusted to allow comparisons between households of different size 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.[51] 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.[52] 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.' This Appendix explores the issue using data mainly from OECD countries.

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', ε:

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

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 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.

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[51]   Studies of equivalence scales in the context of international comparisons include Buhmann *et al.* (1988), Deaton and Muellbauer (1986) and Lanjouw, Milanovic and Paternostro (1998).
[52]   In some countries, young, single people are an exception — they often live alone — although in others younger workers mainly stay with their parents

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), 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 B.1 and B.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. Assuming that elderly households have an average of 1½ people and working age households 3½, Figure B.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 B.1. **Equivalent incomes of workers and pensioners by equivalence elasticity**

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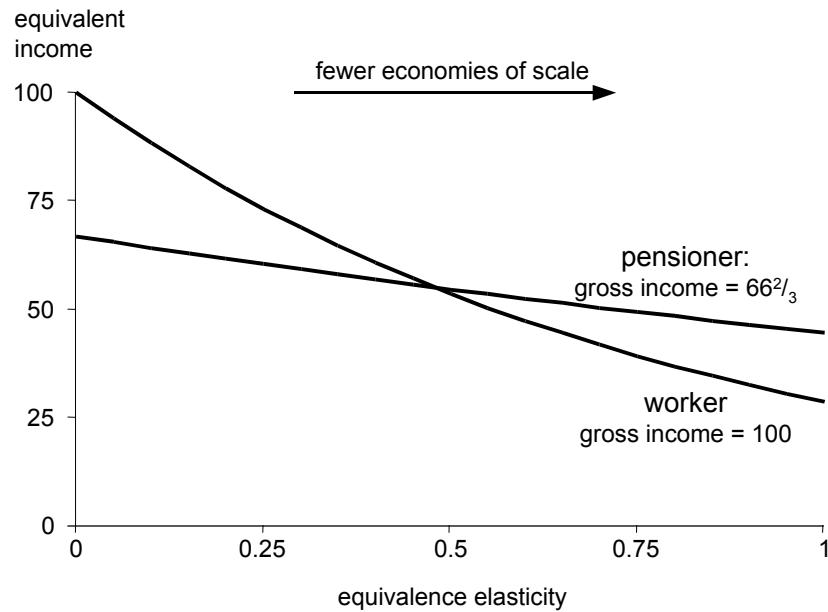
Source: author's calculations

Figure B.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 B.2. **Replacement rate by equivalence elasticity:
ratio of equivalent income of pensioner household to equivalent income of working-age household**
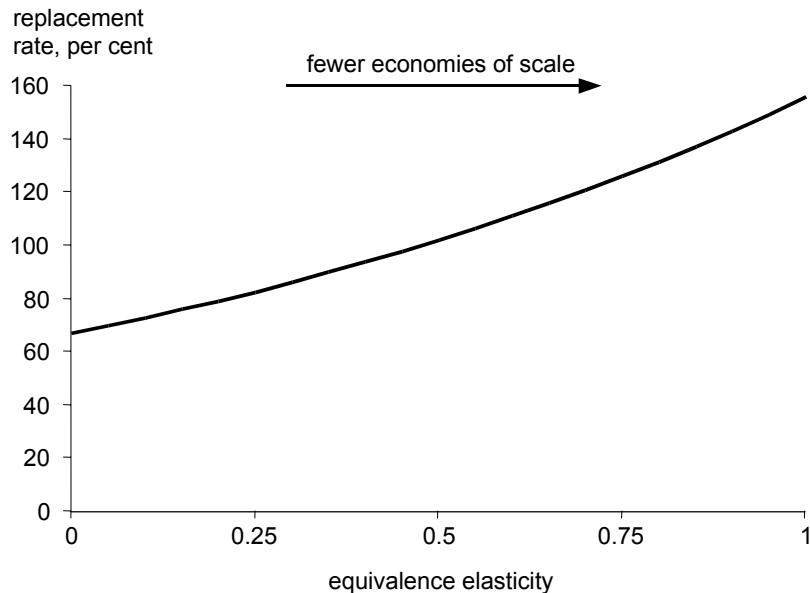
Source: author's calculations

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) and Hauser (1998) use the OECD (1982) equivalence scales. The 'old' scale is:

$$Y_E = \frac{Y}{1 + 0.7n_a + 0.5n_c} \tag{2}$$

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. But 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 B.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 unequivalized 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 $\left(\frac{1}{\sqrt{4}}\right)$

- 0.37 under the old OECD scale ($\frac{1}{2.7}$ *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 ($\frac{1}{2.1}$ *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 B.3. **Adjustments to gross incomes under different equivalent scales by family type**
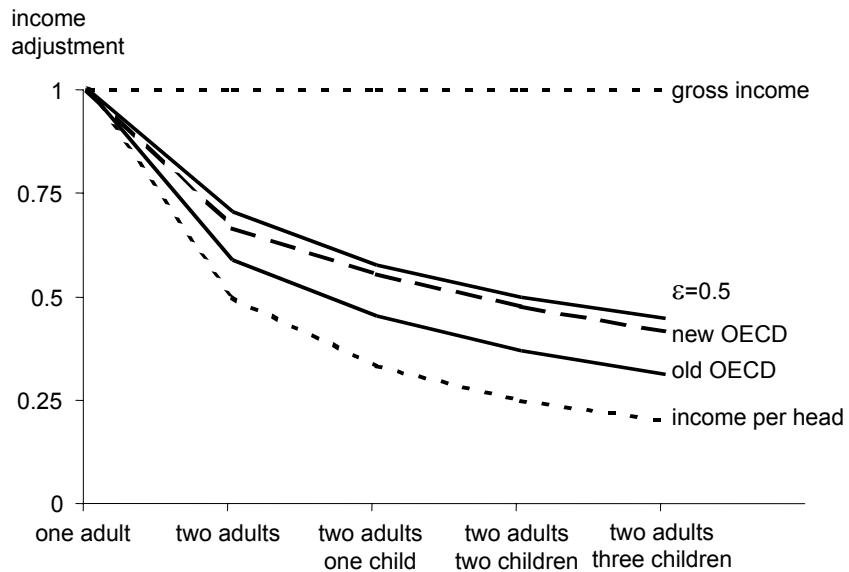
Source: author's calculations

Figure B.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 ten 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 mall 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.

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Figure B.4. **The impact of two alternative equivalence scales: pensioner incomes as a percentage of non-pensioner incomes in six OECD countries by sex, marital status and equivalence scale**
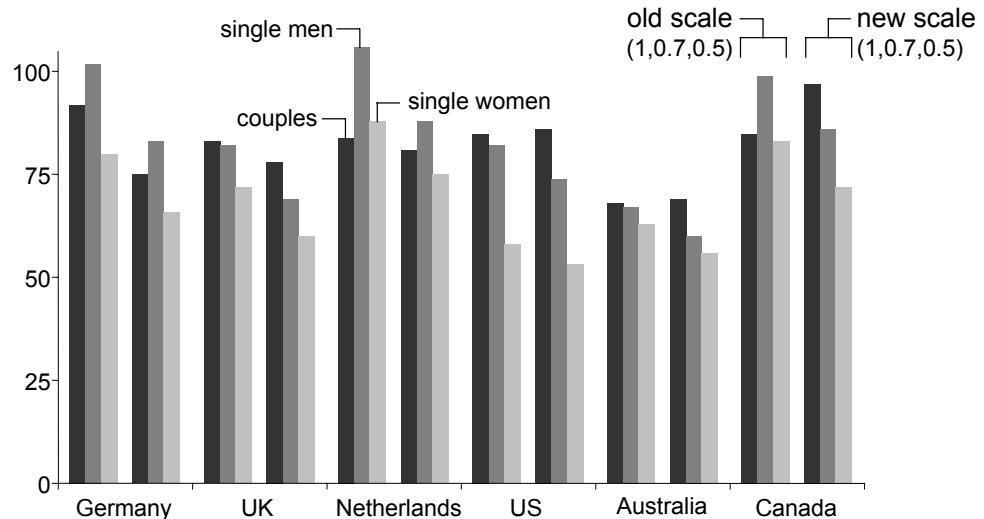
Source: Johnson (1999), Table I1

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 6 and 9 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 8 and 12 per cent. But 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.[53]

The analysis in this Appendix 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.[54] We intend to explore this issue in more detail in future papers in the Pension Reform Primer series on poverty, income distribution and the elderly.

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[53] Some studies have used surveys of popular views on household size and living costs, including Vaughan (1984), Rainwater (1990) and Van der Gaag and Smolensky (1982). They report much lower equivalence elasticities than other methods, typically 0.2-0.3.

[54] 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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