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by Peter Whiteford

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The series is indebted to Diana Encel for her continuing editorial contribution.

Tony Eardley
Editor

Abstract

Comparative studies of social security systems have increasingly turned towards the use of replacement rates as measures of the level of benefits in different countries and therefore of the degree of social protection afforded by different welfare systems. The rationale for this is that replacement rates provide consistent measures of the relative generosity of payments and therefore indicate the 'quality' of social security systems. This paper reviews the use of replacement rates in comparisons of the generosity of retirement pensions and argues that they are not necessarily reliable as such measures. This reflects a number of factors, including incomplete measurement of benefit packages and differences in what must be bought out of disposable incomes. Most importantly, the paper suggests that the levels of earnings in different countries are not independent of the processes of redistribution. In particular, countries which rely on social security contributions from employers appear to provide more generous benefits than those which rely on income taxes or employee contributions. This is a consequence of the fact that employer contributions do not figure specifically in the calculation of replacement rates. The relative generosity of benefit systems is overstated in countries which rely on employer social security contributions to fund benefits. The paper concludes that a range of complementary indicators of social security systems should be used in future analysis of these issues.

1 Introduction

Comparative studies of social security systems have increasingly turned towards the use of benefit replacement rates as the basis for ranking outcomes in different countries. Benefit replacement rates are usually calculated by comparing the levels of statutory entitlements to some measure of incomes in work, thus showing what percentage of earnings[1] is 'replaced' by benefits. That is,

$$\text{Replacement Rate} = \frac{\text{Income when receiving benefits}}{\text{Income when employed}} \qquad (1)$$

Over the past 15 years, many studies have used replacement rates as the basis for comparing the generosity of different benefit systems, including Day (1978), Aldrich (1982), Bradshaw and Piachaud (1980), Kamerman and Kahn (1983), Bolderson (1988), Myles (1989) and Bolderson and Mabbett (1991). The UK Department of Social Security (DSS) regularly publishes time series of pension and benefit replacement rates, with the series going back to 1948 (DSS, 1993). The Nordic Social Statistics Committee also apparently publishes similar data for the Nordic countries (see Øverbye, 1992). A recent publication by the Commission of the European Communities (1993) contains details of benefit replacement rates for the retired, unemployed, invalids, and lone parents, as well as the value of maternity and child benefits assessed on this basis. Amzallag (1994) has undertaken a survey of replacement ratios of retirement pensions in 13 countries for the International Social Security Association (ISSA). Replacement rates (as well as other measures) have been used in recent comparative research on support for families with children by Bradshaw et al., (1993) and on assistance for lone parents by Whiteford and Bradshaw (1994).

The most detailed set of replacement rates is that developed as part of the comparative welfare state project of the Swedish Institute for Social Research. This has been used by Palme (1990), in his study of the development of pension rights in 18 OECD countries for the period 1930 to 1985. These replacement rate data have also been used by Esping-Andersen (1990) as a component of his 'decommodification index' and as part of the basis for classifying countries into different welfare state regimes.

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[1] Earnings can be measured either before or after taxes and social security contributions, although it is usually concluded that net benefits and net earnings are more appropriate indicators of the living standards of benefit recipients relative to those of workers. Replacement rates can also be calculated on an individual basis for workers who have just retired, or on a more aggregate basis.

Replacement rates can be used as measures of work disincentive effects of benefit systems (Saunders, Bradbury and Whiteford, 1989; Bradbury, Ross and Doyle, 1991), but in most studies cited above, they are used as measures of benefit generosity. As such, replacement rates have been the basis of strong conclusions about the relative performance of different welfare systems. This is most obvious in the case of Esping-Andersen (1990), where, as noted, replacement rates are one component of his decommodification index. Myles (1989) uses replacement rates as part of his index of the quality of the citizen's wage, concluding that Sweden had the highest quality citizen's wage, and Australia the lowest. Palme (1990) uses net replacement rates of pensions relative to average production workers' wages as a criterion for describing British retirement pensions as 'residual'. Bolderson (1988) uses the low measured replacement rates of benefits in Australia to argue that means-testing of benefits may be less redistributive than is often argued, since means-testing is associated with lower benefit levels.

Despite the range of these studies, there is relative unanimity in their findings. For example, Table 1 shows the replacement rates provided by retirement pensions in the countries of the European Union. Replacement rates appear to be high in Greece, Spain, Italy and Portugal, and low in Ireland and the United Kingdom, and relatively low in Denmark.[2] Figures of this sort have been used by the journal *Labour Research* to argue that 'state pension arrangements in the UK are among the least generous of any of the 12 member states. Only in Ireland do pensioners suffer a greater fall in living standards when they retire on to state pensions, and even there, in some circumstances, pensioners can be better off than here' (1993: 7).

Aldrich (1982) also calculated the value of the pension as a percentage of average earnings in manufacturing, as shown in Table 2. While these results are now dated, they cover a range of non-European countries, and again suggest that replacement rates were lowest in the English-speaking countries and Denmark, and highest in Austria, France, Italy, and Sweden.

2 What do Replacement Rates Measure?

The use of replacement rates in international comparisons has a number of justifications. In many social insurance systems statutory benefit levels are set

[2] Amzallag (1994) also finds that replacement ratios in the year immediately after retirement are highest in Italy, Iceland, Austria, Israel, Germany and Spain, and lowest in the USA, Canada and Norway.

Table 1: Retirement Pension Replacement Rates in the European Community: 1992
(Benefits as percentage of average net earnings of manual workers in manufacturing)

	Contributory Pension - personal rate	Minimum Benefit - adult dependant	Minimum Benefit - personal rate
Belgium	73	80	47
Denmark	60	77	52
Germany	77	69	39
Greece	107	114	8
Spain	97	98	32
France	88	83	46
Ireland	42	62	35
Italy	89	89	19
Luxembourg	78	77	46
Netherlands	49	67	49
Portugal	94	98	30
United Kingdom	44	59	31
EC average	75	81	36

Source: Commission of the European Communities, 1993: 54.

by reference to wage levels in work. In the United States, Japan, Germany, Italy, Austria and France, for example, earnings-related pensions have been determined either by reference to years of employment multiplied by some percentage of assessed wages over defined periods or as a total percentage of earnings averaged over some period. In Sweden and the United Kingdom, such formulae are included in the earnings-related supplements to basic pensions. In these circumstances, an increase in the replacement rate or the

Table 2: Replacement Rates of Social Security Age Pensions for Workers with Average Earnings in the Manufacturing Sector: 1969 to 1980 (Pension as percentage of earnings in year before retirement)

	Single person						Couple					
	1969	1975	1977	1978	1979	1980	1969	1975	1977	1978	1979	1980
Austria	67	63	64	65	67	68	67	63	64	65	67	68
Canada	24	33	33	32	33	34	41	47	47	47	48	49
Denmark	31	29	27	28	30	29	45	44	44	48	54	52
France	41	60	64	67	67	66	56	74	78	79	77	75
Germany	55	51	54	54	50	49	55	51	54	54	50	49
Italy	62	61	64	66	66	69	62	61	64	66	66	69
Japan	26	37	53	54	54	54	27	39	57	57	57	61
Netherlands	43	43	45	44	44	44	61	61	65	65	65	63
Sweden	42	57	59	63	68	68	56	73	73	79	79	83
Switzerland	28	40	39	38	37	37	45	60	59	58	56	55
United Kingdom	27	31	28	29	29	31	43	47	43	45	45	47
United States	30	38	40	41	41	44	44	58	60	61	62	66
Australia	24	25	28	28	28	28	43	41	46	47	47	47
New Zealand	28	29	31	37	41	39	52	49	51	61	68	64

Source: Aldrich, 1982; Donald, 1984

rate at which it increases for each year of contributions appears unambiguously to indicate more generous benefits.

Palme (1990) notes that comparing pensions to the disposable income of an average production worker assists in measuring the degree of 'benefit stratification', that is, the extent to which benefits vary with the previous income of the recipient. These measures are also in line with theoretical interest in working class mobilisation and market independence (Esping-Andersen, 1990).

Most importantly, using replacement rates is a way of standardising across countries, or in Palme's term, achieving 'scale invariance' (1990: 35). This implies that replacement rates provide a consistent measure of relative benefit levels in different countries. For example, a replacement rate of 50 per cent, say, in Finland and Sweden should provide equivalent **relative** living standards in each country. Further, a replacement rate of 60 per cent in Norway should be one-fifth more generous than a replacement rate of 50 per cent in Sweden, and twice as generous as a replacement rate of 30 per cent in Australia.

Palme notes that it would also be possible to achieve standardisation by converting the value of benefits to a common currency, since money is a consistent metric. But he goes on to note that exchange rates are not good indicators of purchasing power, and that Purchasing Power Parities (PPPs)[3] are only available for the most recent period in which he is interested (Palme, 1990: 35). Bolderson goes further, however, and rejects the use of absolute standards of adequacy of benefits using PPPs:

> the power of beneficiaries to purchase in country X, while seemingly high in the eyes of country Y, might well fall far below what was 'normal' in country X. We therefore adhered to a relative standard, and measured the disposable income of beneficiaries against that of the 'average' person in work in each of the countries. (Bolderson, 1988: 279)

The argument that comparisons across countries should be based on relative standards is widely assented to, including by the present writer. This paper argues, however, that replacement rates do **not** provide consistent relative measures of the generosity of benefit systems. This is due to three main factors: first, not all aspects of benefit systems and their function within the broader

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[3] The purchasing power of a currency is determined by the amount of goods and services that may be purchased with a unit of that currency; that is, a given sum of nominal earnings when converted at the PPP rates will purchase the same basket of goods and services in all countries. As such, PPPs are preferable to use of the market exchange rate which may be volatile and not reflect relative price levels in different countries.

income distribution are taken into account; second, average gross earnings are not comparable across countries; and third, comparisons of disposable earnings are distorted by the different mix of public and private sector provision in different countries.

The paper now turns to each of these arguments in turn, but their overall significance can be illustrated by the following example. Palme's analysis of minimum pension net replacement rates[4] shows that Sweden had one of the highest replacement rates in 1985 at around 58 per cent, while in Australia the corresponding figure was 38 per cent, so that the basic Swedish benefit was 50 per cent more generous than the Australian benefit.[5] Comparisons of benefit levels adjusted by purchasing power parities give a very different picture, however. Hedin (1993) gives the level of the single old age pension in Sweden in 1993 as SEK 32,364, with the income-tested pension supplement adding a further SEK 18,710, for a total minimum benefit of SEK 51,074. In April 1993, the standard (single) rate of age pension in Australia was $156.05 per week, which on an annual basis is $A 8,136.45. Adjusting by OECD purchasing power parities (SEK 10.1 = $US 1.00 = $A 1.33) gives an Australian minimum pension level equivalent to SEK 61,788 or 21 per cent higher than the total minimum benefit in Sweden.[6] The OECD estimates that in 1990 Gross Domestic Product per capita (adjusted by PPPs) was 6.3 per cent higher in Sweden than in Australia.

Because of timing differences it is not possible to be definitive[7], but it appears reasonable to argue that in fact the minimum pension level in Australia is higher than the minimum pension in Sweden, particularly bearing in mind that Sweden is a somewhat richer country than Australia. This raises the possibility that replacement rates may not provide accurate cardinal measures of benefit generosity, and moreover may not even provide correct rankings of countries.

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4 The minimum pension is the pension provided for a single person through the means-tested system, assuming that individual has not made even minimum contributions to the contributory system.

5 Aldrich (1982) also found that replacement rates were lowest in Australia and next to highest in Sweden. Myles (1989) calculates that the replacement rate (index) for the lowest paid worker was 50 per cent higher in Sweden than in Australia in 1975.

6 No account has been taken of housing assistance or of non-cash assistance for either country (e.g. fringe benefits).

7 The real level of minimum pensions in Australia has increased since the mid-1980s (Bradbury, Doyle and Whiteford, 1993), although the extent of this increase is unlikely to affect the point made here.

3 The Level of Benefits

Equation (1) above shows that there are two elements in the calculation of replacement rates, with the numerator being benefit income and the denominator being income when employed. Differences in replacement rates will therefore reflect differences in either factor, although using replacement rates as measures of benefit generosity implies that one is most interested in the numerator, the level of benefits. However, this section argues that the types of replacement rates shown in Table 1 may be misleading, because they do not give a comprehensive picture of the full package of benefits available at different income levels.

As a starting point, Berghman, Van Vorselen and Kehla (1991) point out that replacement rates are based on entitlement rules, and represent the maximum payment available in the circumstances specified. Many retired persons will not have full contribution records, either because of long-term unemployment, disability, child care or other caring responsibilities, or periods of part-time work. Where replacement rates are calculated by reference to income in the year immediately after retirement and retirement pensions are indexed by less than movements in earnings, individuals' replacement rates may fall substantially over time (Amzallag, 1994). In addition, where the minimum income in retirement is provided through income-related benefits, then these comparisons implicitly suggest 100 per cent take-up of benefits, or at least that there are not major differences in take-up between countries. That is, these sorts of replacement rates are indicators of how the pension system is intended to work, not necessarily how it does work.

It is useful to distinguish between the replacement rates offered to workers at different levels of earnings, as has been done by Myles (1989) and Palme (1990), but not by the Commission of the European Community. For example, Palme calculates replacement rates for persons with low earnings who meet only minimum rather than full pension contribution conditions, for persons receiving a full pension, having met the maximum years of contributions required, and for persons who have fulfilled the maximum contribution requirements and have had earnings at the maximum level taken into account for benefit purposes (Palme,1990: 34). Amzallag (1994) has calculated replacement rates for individuals with a low level of wage progression over their working lives and for skilled employees with a high level of progression.

These distinctions are a reminder that different pension systems have different objectives. Income-related systems such as those in Australia or New Zealand are not intended to replace the earnings of highly paid workers, while systems such as those in the United Kingdom or Canada, that have a relatively low earnings-related component should also not be judged on replacement rates for

high wage earners. Statements such as those made by *Labour Research* (1993) that British pensioners get the worst deal in Europe therefore can not be justified on the basis of measured replacement rates alone, since these replacement rates assume that the average retiree has no resources apart from the basic pension. In countries where the state provides only weak earnings-related benefits, the earnings replacement function is served by occupational and private superannuation, which therefore have to be taken into account when considering the financial position of the average worker on retirement.[8]

This view has been put by Berghman, Van Vorselen and Kehla (1991) in commenting on Aldrich's (1982) comparison of benefit replacement rates.

> At first sight the level of the replacement ratio differs greatly. In reality, however, differences may be less extreme. In fact...[Aldrich's result]... provides a good illustration of how misleading comparative data may be if the information is restricted to public pension schemes. As was stressed earlier, the share of public pensions in total pension provisions varies significantly from country to country. If, for example, a single manufacturing worker in Denmark receives a public pension benefit that represents 29 per cent of the average wage of the previous year after a full career and his Swedish colleague gets perhaps 68 per cent, this does not necessarily mean that a Danish retired manufacturing worker is worse off. In Denmark, a whole set of occupational pensions is, in fact, in operation, providing additional pensions ... In Sweden, on the contrary additional earnings related income protection is incorporated into the public pension system itself. Hence, to get a realistic and reliable picture of the real replacement ratio of old age benefits, not only public but also occupational and personal pensions should be taken into consideration. (Berghman, Van Vorselen and Kehla, 1991: 14-5)

It follows that if it is the level of basic pension that is of most interest, it is to the extent that it provides the only or main income source for some older people. The arguments of Berghman, Van Vorselen and Kehla (1991) reinforce the

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8 In addition, there will generally be more workers with earnings below the average than above the average, i.e. the 'average' wage or more goes to less than 50 per cent of full-time wage earners, and far less than 50 per cent of non-retired adults. This implies that the person earning the average full-time wage may be more likely to have private or occupational superannuation, even where this apparently covers a minority of the working population.

desirability of considering the entire resource package of older people, rather than just one component.[9] It is important to ensure that all relevant benefits are included in the calculation of minimum replacement rates.

This has not necessarily been the case in past studies. For example, Table 1 showed that the minimum benefit for the retired in the United Kingdom was apparently less than the contributory pension. In fact, the level of Income Support for pensioners is higher than the level of the retirement pension. The Commission of the European Communities - including in the Mutual Information System on Social Protection in the Community (MISSOC) tables - has taken the Category D retirement pension for those over 80 years as the minimum benefit for older people. This is clearly a misleading measure of the minimum benefit for older people in the United Kingdom.

A detailed analysis of minimum benefit **packages** has been undertaken by Whiteford and Bradshaw (1994) in a study of the structure of social assistance (at May 1992) for lone parent families in 17 countries (the members of the European Union, plus Australia, Japan, Norway, Sweden and the United States). This analysis took account of indirect assistance, defined as reductions in costs of health care, housing, local taxes, and education benefits. These were measured as the differences between the costs actually paid by lone parents receiving social assistance and the costs paid by a lone parent in paid work at average earnings. The components of these indirect benefit packages varied widely between countries. For example, health care subsidies are very substantial in the United States, where lone parents on the Aid to Families with Dependent Children (AFDC) Program are covered by Medicaid (and older people are covered by Medicare). In most other countries, apart from Ireland and Japan, indirect assistance with health care costs was low or non-existent. In contrast, in many countries - but not the United States - assistance with housing costs was substantial.

The value of indirect assistance varied widely, being zero in Belgium and Luxembourg, and very low in Portugal, Spain and the Netherlands. This assistance was not substantial in Sweden, Italy and Norway, but was equal to about one quarter of the cash benefit package in Denmark and France, a third in

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[9] For some purposes researchers may be more interested in the structure of the benefit system rather than the overall distributional outcomes to which the benefit system is a partial contributor. It may be argued that the **form** in which retirement incomes are arranged should be taken into account in comparisons across countries. Judgements of this sort underlie Esping-Andersen's decommodification index, where the delivery of income on the basis of social rights rather than previous earnings level is of crucial interest. In an analogous way, it can be argued that the provision of means-tested benefits is qualitatively inferior to benefits based on citizenship. It should be recognised, however, that this is different from saying that older people are financially worse-off in one country compared to another (unless the form in which benefits are provided affects the level of take-up, for example).

the USA, 40 per cent in the United Kingdom, half in Australia and Japan, two-thirds in Ireland, and in Germany the value of the indirect (housing) subsidies was greater than the level of cash social assistance paid. It would clearly be of interest to have similar results for cash and indirect benefits for older people. While such data are currently lacking, it is likely that indirect subsidies for the retired are substantial.

4 The Level of Gross Earnings

The calculation of replacement rates also requires information on the incomes of people in work. The first stage is to determine the type of worker to use as the base, and to identify their gross earnings so that disposable earnings may be calculated. In virtually all studies using replacement rates, the position of the average worker in the manufacturing sector has been taken as the base, primarily because of the ready availability of data. Information on earnings in manufacturing is available from the Organisation for Economic Co-operation and Development (OECD), the International Labour Office (ILO), and the Statistical Office of the Commission for the European Communities (Eurostat). The ILO and the OECD series encompass a wider range of countries than the Eurostat data, and have been in existence for longer. The discussion that follows concentrates on the OECD series, although the issues raised are potentially relevant to all.

The OECD has produced analyses of the tax-benefit position of 'average production workers' since 1972, and the most recent figures relate to the 1992 tax year. The publications contain details of the operation of the personal income tax system in each OECD country, and also include information on the effects of employee social security contributions. The OECD reports present information comparing the circumstances of full-time production workers (APW) in the manufacturing sector in each country whose earnings are equal to the average earnings of such workers. They then estimate the impact of personal income tax liabilities and employee social security contributions on the disposable income of the APW.

The OECD emphasise that comparisons based on these data must be qualified by several factors. First, it is noted that whilst the APW is working in the manufacturing sector in each country and is therefore doing similar kinds of work, his or her earnings will occupy a different position in the distribution of earnings in each country. Differing proportions of the labour force in each country are employed in the manufacturing sector. For example, in 1991 manufacturing employment ranged from around 16 per cent of all employees in Australia, Canada and Norway, to between 33 and 35 per cent in Germany, Luxembourg and Switzerland, with most other OECD countries being between

20 and 30 per cent. Second, the taxes included are personal income tax and employees social security contributions, which provide differing proportions of total tax revenue in different countries. As a result, the data cannot be taken as an indication of the overall impact of the tax system. Similarly, only a restricted range of information on government benefits is included.

The OECD also note a number of specific limitations. The data do not include unearned income, and separately take account of the effects of non-standard tax reliefs (e.g. for work expenses or mortgage interest). In all countries except Belgium, the earnings figures cover both male and female earners. In Belgium only male earners are included, which would tend to raise the earnings level there relative to other countries. The data for New Zealand include white collar workers, leading to a probable increase in the earnings level of between five and ten per cent. It is not possible to separate part-time workers from full-time workers in Finland, Ireland and Turkey, probably depressing the estimated average earnings for these countries. The coverage of manufacturing employees varies across countries, and there are differences between the comprehensiveness of the earnings base with, for example, fringe benefits being included in only some countries.

Despite these caveats, the OECD argues that

> the data are comparable for the specific limitations referred to, and the results show the proportion of gross earnings retained. **This net cash income can be seen as the amount over which the household is able to exercise a free choice in the allocation of its expenditure.** (OECD, 1993: 24, emphasis added)

This judgement about the usefulness of the OECD data has, not surprisingly, been accepted by users of this series. Bolderson describes the OECD data as ‘the best comparable figures available despite some limitations’ (1988: 278). Shepherd and Prasado Rao (1989) state that ‘arguably, no alternative earnings data, such as national average weekly earnings or an earnings series for particular groups of employees, are as yet available, particularly at the net earnings level, with the same degree of consistency’ (1989: 1). In a review of Kamerman and Kahn (1983), McVicar (1985) notes that while the net APW earnings is not a perfect basis for comparing assistance to families in different countries, ‘the authors state that OECD experience shows its limitations to be less than for alternatives’ (1985: 90).

5 Are Gross Earnings in OECD Countries Comparable?

Despite this unanimity there are serious questions about the comparability of the OECD series, as well as any other comparisons of average earnings across countries. Table 3 shows gross earnings of average production workers in 1992, in national currency terms and adjusted by OECD purchasing power parities (PPPs) to $ US, and expressed as a percentage of the average for all countries.

The PPP adjusted value of the APW's earnings varies between countries, being lowest in Portugal (disregarding the 1989 figures for Greece), and highest in Switzerland, the United States and Canada. This is not unexpected, given that national income also varies widely between OECD members. What is more surprising are the significant differences between the real income levels of APWs in countries with similar levels of economic development. Moreover, in some countries that are relatively less prosperous, the APW has a greater purchasing power than in wealthier societies. For example, the APWs in Ireland and New Zealand have higher gross wages than the APWs in Austria, Finland, France, Italy, the Netherlands, and Sweden.

One consequence of this variation in the purchasing power of gross production workers' wages is that comparisons of benefit levels across countries, even if 'standardised' by the APW, will imply significant differences between the real purchasing power of benefits. For example, a benefit replacing 50 per cent of gross APW wages in the United Kingdom or Germany will have the same purchasing power as a benefit with a replacement rate of 66 per cent in France or 60 per cent in Sweden. Alternatively, a benefit replacing 45 per cent of gross APW earnings in Denmark or Australia, 40 per cent in Canada, or 38 per cent in the United States will be equivalent to the benefit of 50 per cent of APW in the United Kingdom.

Table 3: Gross Earnings of Average Production Workers in OECD Countries: 1992

Country	APW in National Currency	APW adjusted by PPPs to $ US	Percentage of average
Australia	29,884	22,136	111
Austria	266,163	18,613	94
Belgium	818,277	21,144	106
Canada	30,496	24,011	121
Denmark	212,700	22,676	114
Finland	114,897	16,649	84
France	110,100	16,733	84
Germany	49,904	23,540	118
Greece (1989)	604,474	(4,959)	-
Ireland	12,400	18,960	95
Italy	27,450,000	18,349	92
Japan	3,933,845	20,704	104
Luxembourg	916,000	22,957	115
Netherlands	52,977	18,268	92
New Zealand	30,804	19,620	99
Norway	191,919	20,816	105
Portugal	1,070,141	8,700	44
Spain	1,764,408	14,704	74
Sweden	171,800	17,010	86
Switzerland	56,000	25,225	127
Turkey (1991)	24,015,265	(10,735)	-
United Kingdom	13,705	21,515	108
United States	24,256	24,256	122
Average[a]	-		100

Note: a) The average does not include Greece or Turkey, where the data refer to other than the 1992 year.

Source: OECD, 1987a, 1987b.

These results may appear surprising. For example, is it really true that the gross income of the average production worker in Ireland has roughly the same purchasing power as that of the average production worker in Austria, and is the Irish worker significantly better off than a comparable worker in Sweden or France? There are a number of possible answers to questions like this. In countries like Ireland where agriculture is an important source of employment, it is understandable that manufacturing employees enjoy a high relative position. But there does not appear to be any simple correlation between the proportion of the workforce employed in the manufacturing sector, the level of GDP per head in each country, and the relative incomes enjoyed by manufacturing employees. The obvious conclusion is that the purchasing power of the average production worker's earnings varies widely.

This observation may be considered of limited significance by some users of the APW series, who consider that it is relative not absolute benefit levels that are appropriate in international comparisons (Bolderson, 1988).[10] Table 4 however, shows gross APW expressed as a percentage of Gross Domestic Product per head in each country in 1985 and 1989[11]. This measure of the 'relative' position of production workers shows substantial variation in the level of gross APW wages. In France, the APW earns slightly less than 100 per cent of GDP per head; in Austria, Finland, Norway, Portugal, and Sweden, it is just over 100 per cent of GDP per head; in most remaining countries the value of the gross APW earnings is between about 115 and 145 per cent of GDP per head. The relative position of the APW is particularly high on this measure in Ireland, Spain, and Turkey.

These variations have significant implications for comparisons of relative benefit levels. The last two columns of Table 4 compare benefits that are equal to 50 per cent of GDP per head in each country. This means that in 1985 a benefit that was equal to 36 per cent of the APW's wage in Australia could be regarded as identical to a benefit of around 50 per cent of the APW in Norway, Finland or Sweden. Even more strikingly, a benefit that replaced 27 per cent of the APW wage in Ireland and 51 per cent in France are the same proportion of GDP per head in each country.

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10 It can also be argued that the use of PPPs will be less favourable to countries with high levels of indirect consumption taxes, where the purchasing power of benefits will be low because the costs of goods and services will be high. But these indirect taxes contribute to the costs of provision of other social services, which enhance the living standards of low income groups, but are not included in the measure of benefit generosity. While there is some force in this argument, it suggests that analysis should include measures of these noncash benefits, a point already made.

11 1989 has been chosen as the OECD has not yet published estimates of GDP per head adjusted by PPPs for 1992.

Table 4 : Comparisons of APW Wage and GDP per Head, OECD Countries: 1985 and 1989

	APW Wage as percentage of GDP per head		50% of APW Wage as percentage of GDP per head		50% of GDP as percentage of APW Wage	
	1985	1989	1985	1989	1985	1989
Australia	140	137	70	69	36	36
Austria	106	117	53	59	47	43
Belgium	145	131	73	66	34	38
Canada	126	107	63	54	40	47
Denmark	133	141	67	71	38	35
Finland	103	100	52	50	49	50
France	99	99	49	50	51	50
Germany	125	137	63	69	40	36
Greece	134	151	67	76	37	33
Ireland	187	169	94	85	27	30
Italy	118	116	59	58	42	43
Japan	118	111	59	56	42	45
Luxembourg	117	114	59	57	43	44
Netherlands	136	138	68	69	37	36
New Zealand	131	145	66	73	38	34
Norway	105	105	53	53	48	48
Portugal	105	102	53	51	48	49
Spain	160	139	80	70	31	36
Sweden	101	102	50	51	50	49
Switzerland	137	125	69	63	36	40
United Kingdom	138	137	69	69	36	36
United States	121	105	61	53	41	48

The concerns raised by these figures are reinforced by comparisons of APW data with figures derived from the Luxembourg Income Study (LIS) datasets (Table 5). The APW wage varies as a percentage of gross family incomes, from about 63 per cent in France in 1979 to about 93 per cent in Australia in 1981-82, differences broadly consistent with the results in earlier tables. This means that a benefit in France would have to have a replacement rate about half again as high as a benefit in Australia in order to replace the same percentage of average family incomes. With the exception of France and the Netherlands (and the countries with only one years data included in the Luxembourg Income Study, LIS), there has also apparently been a decline in the ratio of APW's earnings to gross family income over the first part of the 1980s.

Before turning to possible explanations for these differences between measures of relative incomes in different countries, it is important to ask what effect these differences have on comparisons using the APW series. At a general level, benefits will appear more generous in countries where the APW wage is a lower proportion of GDP per head or gross family income. The replacement rate will be higher because the denominator is lower. These results suggest that international comparisons based on the OECD series of APW's earnings - or any similar series - may be misleading. In particular, an assessment of the generosity of benefits in different countries - even the relative generosity of benefits - may be biased unless it is recognised that the average which the series purports to measure may actually mean different things in different countries.

What are the possible explanations for these differences? One is some sort of fundamental difference in the conceptual basis of the data collected in the national surveys which provide the estimates of the earnings of APWs. If this is the case, it is impossible to tell this from the sorts of comparisons provided here. Another possible explanation is that the differences reflect real differences between the relative position of workers in the manufacturing sector in different countries. For example, as already noted, it seems likely that a manufacturing worker in Turkey, say, enjoys a higher relative position (compared to non-manufacturing workers in Turkey) than a manufacturing worker in the United Kingdom or the United States does to other employees in those countries. Similarly, real wages may be higher in some countries than in others with similar real levels of GDP per head, because of the strength of the union movement or the existence of centralised wage fixing mechanisms. The relationship between APW's earnings and the LIS data on family incomes may also be partly explained by the different extent to which family income comes from one or two income earners. The decline in individual earnings as a proportion of family income is consistent with the growth in female labour

Table 5: Comparison of Gross Incomes of Average Production Workers and Average Gross Family Incomes: Early and Mid-1980s

Country and date	Gross income of APW as percentage of gross family income
Australia	
1981-82	93
1985-86	84
Canada	
1981	78
1987	68
France	
1979	63
1984	64
Germany	
1981	86
1984	80
Netherlands	
1983	77
1987	81
Norway	
1979	76
Sweden	
1981	85
1987	79
Switzerland	
1982	74
United Kingdom	
1979	83
1986	75
United States	
1979	76
1986	69

Sources: OECD, various; Luxembourg Income Study datasets; the figures for the United Kingdom use published Family Expenditure Survey data for average household income.

force participation and the increasing number of two income families. But that is just another way of saying that over time the position of the APW has become less representative to varying degrees.

Most importantly, there is the possibility that the level of gross earnings is not independent of the redistributive process. Several factors may affect the relative level of wages across countries, but one that is particularly significant is the level of employer social security contributions and other welfare-related non-wage labour costs. Table 6 provides information on employer social security contributions - the level of employer contributions as a percentage of GDP and of total taxes in OECD countries in 1991 as well as the rates of employer contributions for the average production worker in 1992. There are no employer contributions for social security in Australia and New Zealand, and they are very low in Denmark. Contributions are relatively low in Canada, Finland, Ireland, Switzerland and the United Kingdom. At the other extreme, employer contributions provide around 20 per cent or more of total tax revenue in Belgium, France, Germany, Italy, Spain and Sweden.

It is a remarkable feature of the comparative welfare state literature that very limited attention has been given to the impact of employer social security contributions. There are several alternative assumptions about the incidence of employers' contributions, including that they are passed on to employees in the form of lower wages, passed on to consumers in the form of higher prices, or passed on to workers through higher unemployment, or some combination of these and other effects (Musgrave and Musgrave, 1984: 492-8).

In some countries where the APW's gross income level is relatively low (Austria, France, Sweden), employer social security contributions are a very large source of revenue. It is possible employer contributions in these countries are largely incident upon earnings. In other countries (Belgium, Germany, the Netherlands, and Spain) in which these contributions are an important source of revenue, however, the APW's earnings do not appear to be so low.[12]

Finland also appears to be an outlier, with relatively low wage levels,[13] but also low rates of employer taxes. But Finland has a mandatory employer-funded occupational pension scheme (Kangas and Palme, 1992), although this is not financed through taxes. Employer contributions to this scheme (TEL) were recently reduced from 16.9 to 14.4 per cent of earnings (Foster, 1992).

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12 It should be remembered that the Belgian figures are for male workers only.

13 It should be remembered that the Finnish figures include part-time workers.

Table 6: Employer Social Security Contributions in OECD Countries: 1991 and 1992

	Employer social security as percentage of GDP	Employer social security as percentage of tax revenue	Rate of employer social security contributions(a)
Australia	0.0	0.0	0.0
Austria	6.8	16.2	23.17
Belgium	9.8	21.8	26.49
Canada	3.8	10.2	6.6 to ceiling
Denmark	0.3	0.7	(2.5 % of VAT)
Finland	2.8	7.5	3.45(b)
France	12.0	27.1	up to 35.58
Germany	7.9	20.1	18.25 to ceiling
Greece	5.3	13.8	22.2
Ireland	3.4	9.2	12.2 to ceiling
Italy	9.2	23.2	50.27
Japan	4.8	15.6	7.5
Luxembourg	6.9	14.2	14.86 to ceiling
Netherlands	3.4	7.1	9.27
New Zealand	0.0	0.0	0.0
Norway	7.7	16.3	15.2
Portugal	5.8	16.3	24.5
Spain	8.8	25.4	31.2
Sweden	14.3	26.9	30.92
Switzerland	3.3	10.6	10.25 to ceiling
United Kingdom	3.7	10.4	10.40 to ceiling
USA	4.9	16.5	7.65 to ceiling(c)
OECD average	5.4	13.6	-

Notes: a) Expressed as percentage of APW wage. These figures do not generally include employer coverage of industrial injury and occupational disease.

b) Does not include mandatory employer contributions for earnings-related pensions (TEL).

c) Employers contributions for federal unemployment insurance have a very low ceiling.

Source: OECD, 1993a, 1993b.

The addition of these employer costs to the statutory contributions to social security schemes would lift Finland up to the overall level of contributions of countries like the Netherlands, Belgium and Austria. It should also be noted that a mandatory scheme also exists in Sweden, under which employers would contribute around eight per cent of employees' earnings, in addition to the social security taxes noted in Table 6.

The relationship between the APW wage's, employer social security contributions and GDP per head is explored in Figures 1 to 4. Figures 1 and 2 show the effects of adding employer social security contributions to the APW's wage and its relationship to GDP per head. There is a considerable degree of variance in the middle income countries, with Germany and France, for example, having very similar levels of national income but with average wages in Germany being nearly 50 per cent higher than in France. Adding employer social security contributions to APW wages involves the assumption that these contributions are incident upon wages, often regarded as a reasonable initial assumption (Ringen, 1991). This has the effect of reducing the variance for most of the middle income countries, and also causing changes in relative position. Figures 3 and 4 show the effects of restricting these comparisons to these middle income countries. It is apparent that the positive relationship between national income and average wages was imposed by the inclusion of countries with very different level of national income, such as Ireland and the USA. Indeed, among this narrower group of countries, absolute wage levels appear to fall with increasing absolute levels of national income per head. This result is counter-intuitive.

Figure 5 illustrates the relationship between benefit replacement rates and employer social security contributions. There appears to be a strong correlation between higher employer contributions and higher replacement rates. This could be a real relationship. That is, where employers must pay, then benefits will be more generous. Alternatively, this could reflect the deflating effect of employer social security contributions on wages.

These comparisons remain tentative. But it appears reasonable to suggest that the structure of the tax system in different countries has affected the level of gross earnings of average production workers. A particularly striking illustration of this is the reform to the tax system in the Netherlands in 1990. Employers' social security contributions were substantially reduced, but employee contributions increased. The cash amount of employee contributions at the APW level rose by 42 per cent, while employer contributions fell by 38 per cent. But at the same time nominal gross APW wages increased by nearly 15 per cent, compared to an average of under 2 per

Figure 1: Relationship Between Average Production Worker's Wage and GDP per Head, Selected Countries: 1989

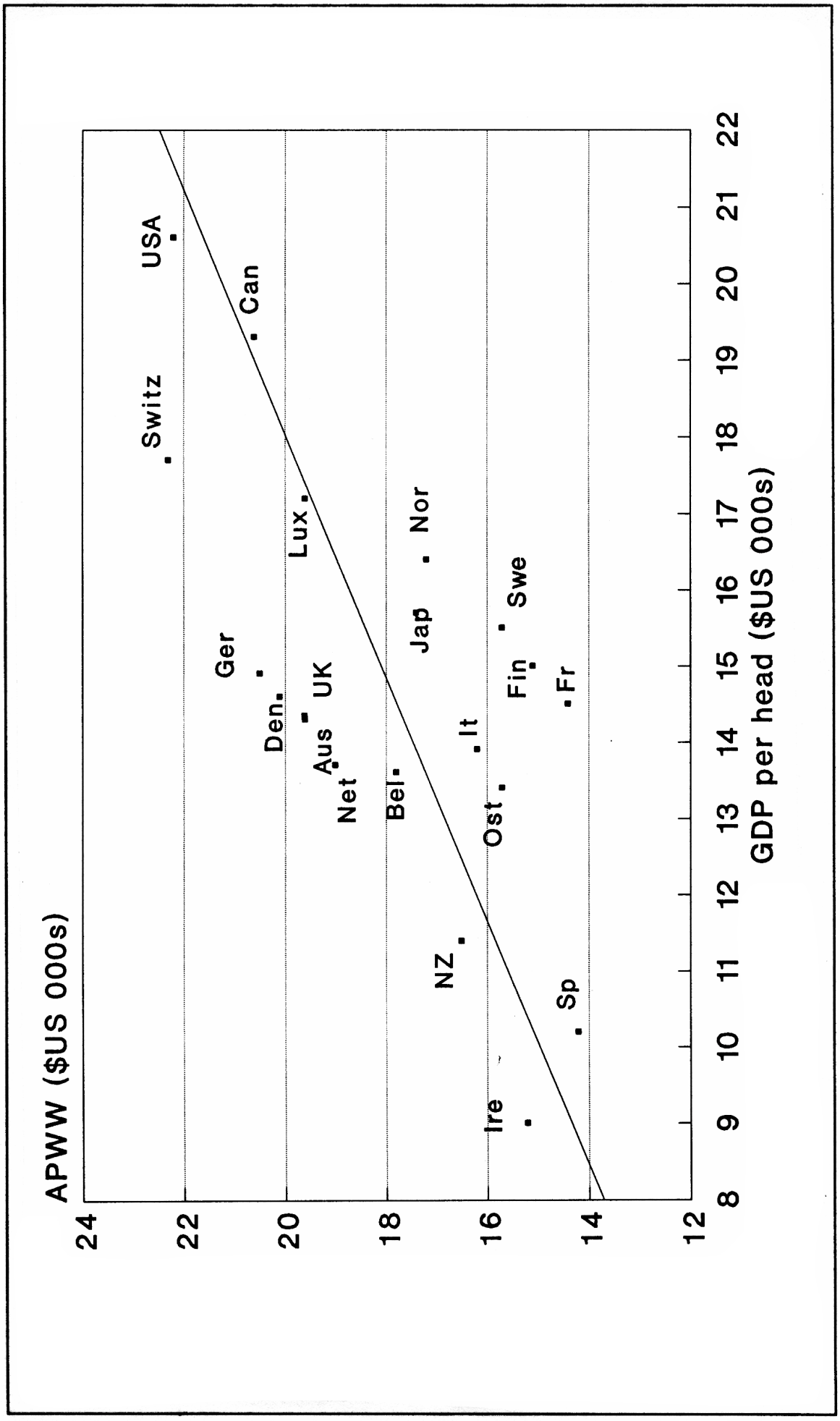
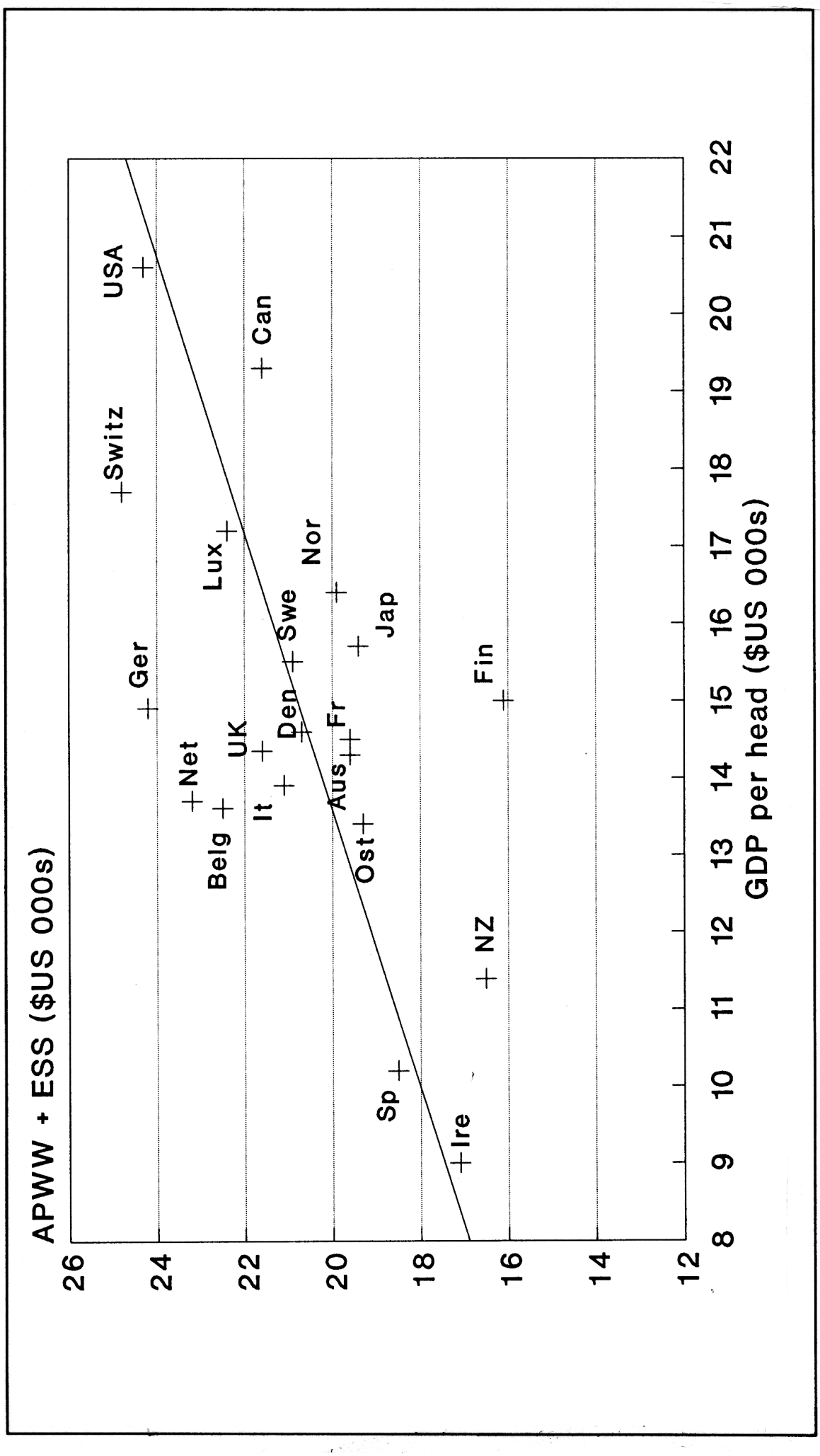


Figure 2: Relationship Between Average Production Worker's Wage plus Employer Social Security and GDP per Head, Selected Countries: 1989



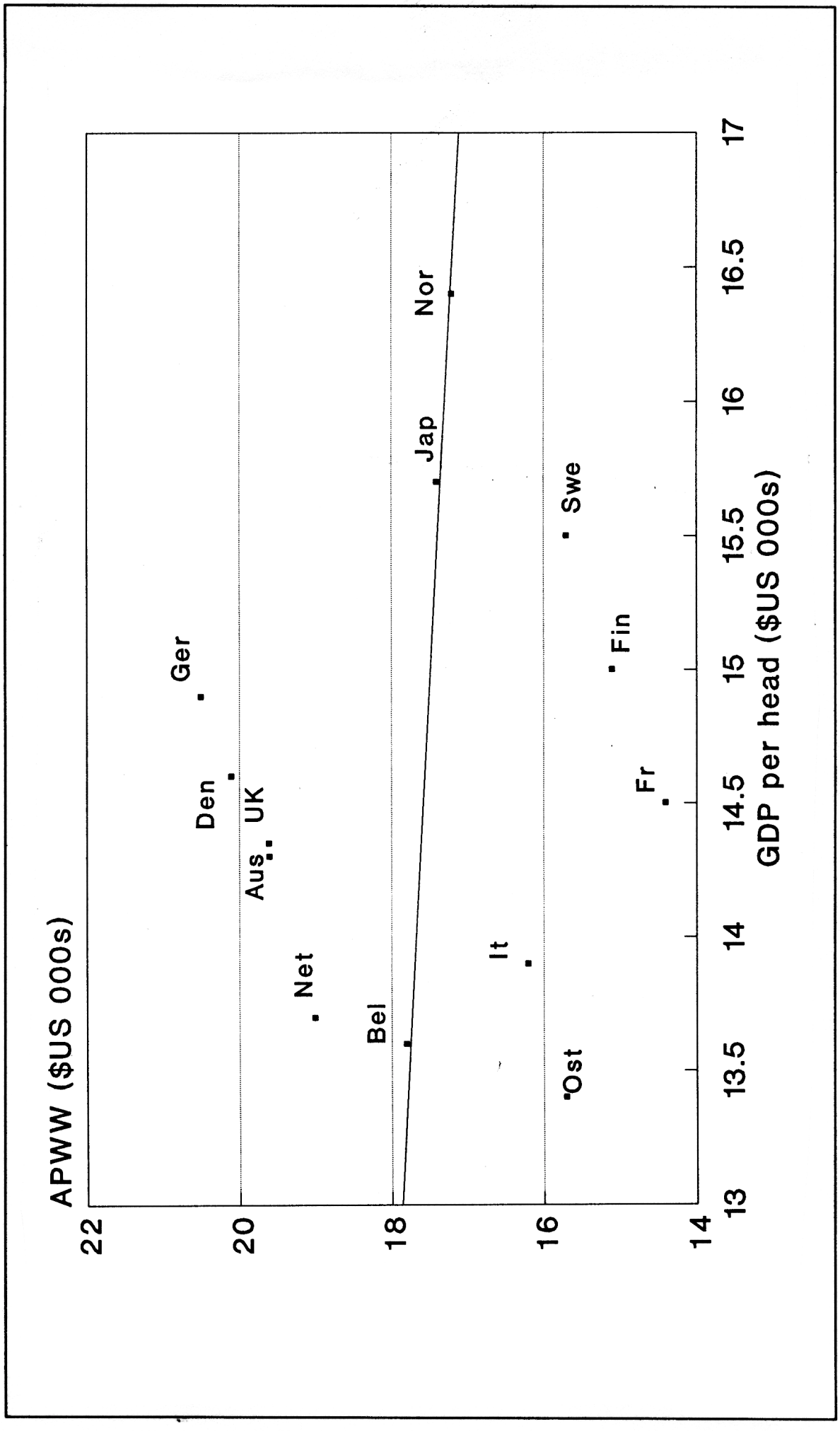


Figure 3: Relationship Between Average Production Worker's Wage and GDP per Head, Selected Countries: 1989

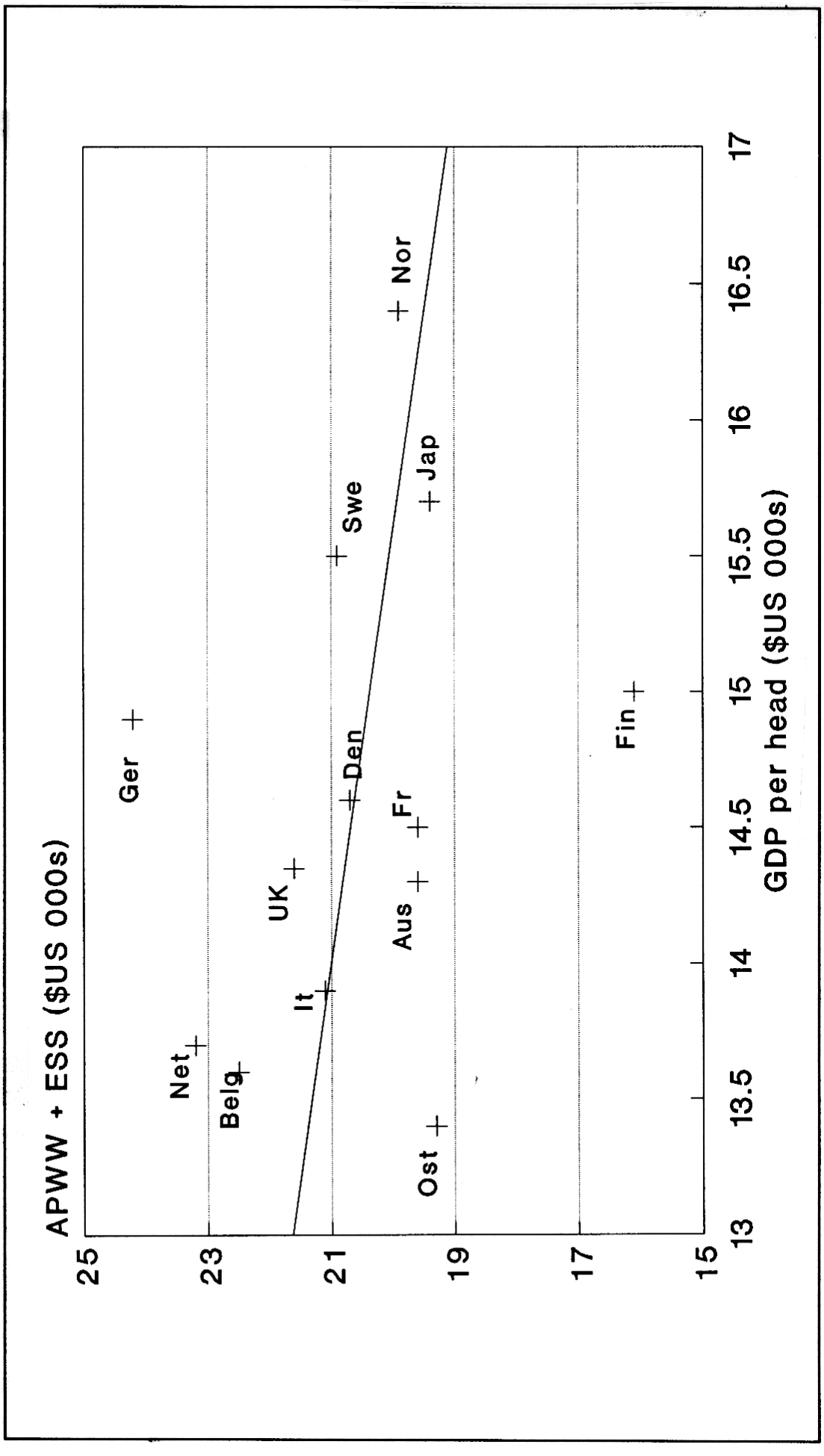


Figure 4: Relationship Between Average Production Worker's Wage Plus Employer Social Security and GDP per Head, Selected Countries: 1989

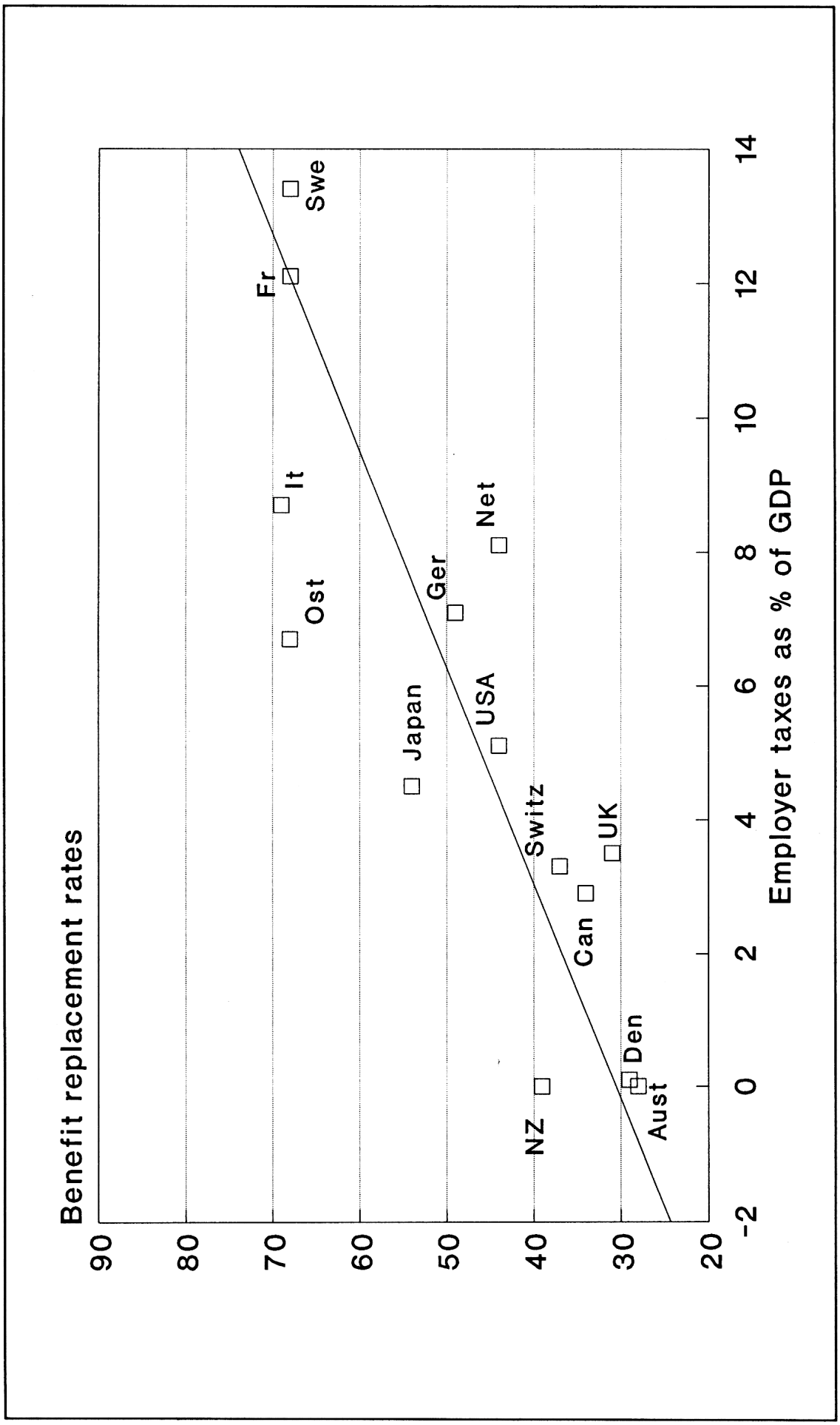


Figure 5: Relationship Between Benefit Replacement Rates and Employer and Social Security Taxes, Selected Countries: 1980

cent for the preceding three years and 5 per cent subsequently (calculated from OECD 1993a: 86).

If wage levels are affected by the level of employer social security contributions, in turn this affects the level of replacement rates offered by public pension systems. Replacement rates are low in countries like Australia, Canada, Denmark, Ireland and the United Kingdom because wages are high. Correspondingly, replacement rates are high in France, Sweden, Austria and Italy, because wages are low. But these wages are artificially low, because account has not been taken of the employer social security contributions that have been paid in addition to these earnings.

6 What is Disposable Income?

The APWs' wage figures are gross income figures, while most studies of replacement rates use net incomes after deducting tax. Clearly disposable incomes are a more appropriate basis for measuring the position of older people relative to those in work (Amzallag, 1994). It may therefore be felt that these disparities between gross wages are not relevant, since net replacement rates will be higher in countries like Sweden and the Netherlands, because those in work are paying higher taxes than corresponding workers in the UK, Australia or the USA, say.

Table 7 shows the average tax rates facing the average production worker in OECD countries in 1992 (OECD, 1993a). Average tax rates ranged from under 18 per cent in Portugal and Spain to 46.9 per cent in Denmark. But not all countries with low gross earnings then have high rates of direct tax. For example, Austria, France, Italy and Sweden show average tax rates comparable to or only a little higher than those in Australia, Canada, or the United Kingdom. In comparisons between these countries, it follows that it is the low level of gross earnings in Austria, France, Italy and Sweden that largely make their replacement rates appear high. In the Netherlands, however, average tax rates on the APW's wage are high, so this will contribute to higher measured replacement rates. [14]

It should also be noted that implicitly the deduction of taxes and contributions suggests that these are pure burdens on taxpayers, and that these are the only

[14] Direct taxes at the APW level have fallen substantially in Sweden and Norway in the period 1989 to 1992, but have risen substantially in the Netherlands, although as noted in the text, employer contributions fell.

Table 7: Average Tax Rates on Single APW's Wage in OECD Countries: 1992 (Tax and social security contributions as percentage of gross earnings)

	Income tax as percentage of earnings	Employee social security as percentage of earnings	Total
Australia	21.9	1.3	23.2
Austria	8.7	17.1	25.8
Belgium	23.4	13.1	36.5
Canada	20.4	5.1	25.5
Denmark	44.5	2.4	46.9
Finland	29.5	5.6	35.1
France	8.0	18.0	26.0
Germany	18.9	18.3	37.2
Greece (1989)	5.8	13.3	19.1
Ireland	23.0	7.8	30.8
Italy	18.7	9.4	28.1
Japan	8.4	7.0	15.4
Luxembourg	12.0	12.4	24.4
Netherlands	12.3	29.6	41.9
New Zealand	24.0	-	24.0
Norway	20.9	7.8	28.7
Portugal	6.2	11.0	17.2
Spain	11.7	6.0	17.7
Sweden	28.0	-	28.0
Switzerland	11.4	10.3	21.7
United Kingdom	18.0	7.6	25.6
USA	18.3	7.7	26.0

Source: OECD, 1993a.

costs that should be treated this way. This judgement is made explicitly in the OECD's statement quoted earlier that net cash income can be seen as the amount of money over which the household is able to exercise a free choice in the allocation of its expenditure. Reflection suggests that this view can give a seriously distorting view of the relative well-being of the average worker in different countries.

This has been recognised by the OECD, who also note:

> The income left at the disposal of a taxpayer may represent different standards of living in different countries because the range of goods and services on which the income is spent and their relative prices differ as between countries. In those countries where a wide range of goods and services is provided (free health services, public housing, etc.) the taxpayer may be left with less cash income but may enjoy the same living standards as a taxpayer receiving a higher cash income but living in a country where there are less state-provided goods and services. (OECD, 1993a: 20)

If we take the example of health care, it can be noted that public expenditure on health is very high in Sweden. The high level of taxes paid by workers in Sweden gives them entitlement to substantially free medical care. In the USA, in contrast, workers pay lower taxes, but they must either pay for medical care privately or pay health insurance unless their employer provides this. In the OECD's terms, an uninsured worker in the USA would certainly have more money to allocate to other forms of consumption than a publicly covered worker in Sweden, but many American workers would not feel better-off as a result, particularly where their lack of coverage was a consequence of the high costs of private insurance. Similarly, average workers in Australia pay lower taxes than average workers in Germany, but the average Australian worker must also consider that he or she will have a low or nil entitlement to an age pension. If they wish to secure an adequate income in retirement then they will need to join a private or occupational pension scheme or make other forms of private savings.

In summary, what workers have to pay for out of their after-tax incomes varies substantially across countries. To the extent that higher taxes pay for benefits for workers, than those benefits must be included in the calculation of disposable incomes and replacement rates. In addition, the relative well-being of persons in retirement is affected by the redistribution across the lifecycle involved in many ‘private’ activities, such as purchasing a house or saving privately for retirement.

This view is illustrated in Table 8 taken from a Canadian study of retirement replacement rates (Wolfson, 1987). The top panel of the table shows the usual approach to replacement rates as set out in Equation 1. The bottom part of the table shows how this measure could be made more comprehensive. This is a measure of replacement incomes rather than benefit replacement rates, but that simply means it would provide a better measure of outcomes in retirement rather than a partial measure of inputs. This approach also highlights the fact that the appropriate measure of replacement incomes may vary across contingencies. For example, when a worker retires they do not need to save for retirement (although they may wish to save for future medical bills or to pass on assets to their children). However, if a worker becomes unemployed or disabled they may still need to save for retirement.

Implementation of this measure of replacement rates would be far more complex than the usual ways of estimating replacement rates, and it is unlikely it would be possible to develop an extensive time series for a wide range of countries, as was done by Palme (1990). Nevertheless, this formulation exposes the limitations of the standard approach to estimating replacement rates and is a reminder of the caution that should be taken in drawing conclusions from these measures. This approach also suggests that it is necessary to combine microdata and modelling to measure the true circumstances of beneficiary groups.

7 Absolute Benefit Levels

The previous discussion has suggested that replacement rates may not provide accurate indicators of the degree of social protection offered by social security benefits in different countries. As noted previously, an alternative is to compare the level of benefits adjusted by purchasing power parities, although this provides a measure of the 'absolute' generosity of benefits, in that part of the difference between countries on this measure will be due to differences in the level of national income.

Table 9 shows minimum benefits for single older people in 1991, taken from a study for the Council of Europe by Hatland, Øverbye and Vigran (1993), supplemented by similar estimates for Australia, Canada, New Zealand and the USA. The minimum benefits are expressed in $US, and also expressed relative to the level of minimum benefits (SSI and Food Stamps) in the United States. Given that the United States is by far the richest of these countries, it is striking that many other countries provide much higher minimum benefits. This result is consistent with those studies using replacement rates, but other

Table 8: The Definition of the Net Replacement Rate in Retirement

Numerator: post-retirement consumption	**Denominator: pre-retirement consumption**
Positive items:	Positive items:
Cash benefits	Labour earnings
Negative items:	Negative items:
Direct taxes	Direct taxes
	Social insurance contributions
Possible refinements to the definition of the net replacement rate	
Additional positive items:	Additional positive items:
Occupational and private pensions	Investment income
Investment income	Interest income
Interest income	Imputed rent on owner-occupied housing
Interest portion of annuity income	Government noncash benefits
Imputed rent on owner-occupied housing	Health
	Housing
Government noncash benefits	Education
Health	Transport
Housing	
Education	Additional minus items:
Transport	
	Indirect taxes
Dissaving	
Drawing down savings	Work-related expenses
Capital portion of annuity income	
Sale of house or reverse annuity mortgage	Saving
	Bank deposits
Additional minus items:	House downpayment, capital portion of mortgage payments
	Private and occupational pension contributions
Indirect taxes	

Source: Adapted from Wolfson (1987).

comparisons are not. For example, Table 1 showed that replacement rates were lower in Denmark than in Germany, but the reverse is true of the absolute level of benefits. Table 1 also showed that Spain has very high replacement rates, but in absolute terms these basic benefits are quite low. This reflects the fact that Spain is one of the poorer of these countries. But Ireland and New Zealand have rather similar levels of national income per head to Spain, yet provide more valuable minimum benefits. Indeed, New Zealand has a national income per head not much more than half that in the USA, but provides significantly higher basic benefits.[15] Again, the purchasing power of benefits is quite high in Australia, although most calculations of replacement rates suggest that those in Australia are very low. The relationship between minimum benefits in Australia and Sweden shown by this table is also consistent with the argument put earlier in this paper.

Overall, figures of this sort give a very different impression of the degree of social protection offered by some benefit systems. Countries such as Australia, Canada, Denmark, Ireland and New Zealand provide more generous benefits than would be indicated by their replacement rates. Only in the case of Canada can this be said to be due to a higher than average level of national income. Nevertheless, the United States and the United Kingdom have both low replacement rates and low absolute benefit levels, although relative to its national income the UK is far more generous than the USA. In contrast, minimum benefit levels in Finland, Norway and Sweden are not as generous in absolute terms as could be expected from estimated replacement rates.

It would clearly be important to investigate comparisons of this sort in more detail. But these results suggest that the use of replacement rates as measures of benefit adequacy in different countries are potentially misleading. Indeed, if replacement rates do nor provide accurate rankings of countries, much less measure the distance between benefits in different countries, then they probably should be abandoned in international comparisons, or at least used in conjunction with other measures that correct for their errors. In addition, studies which incorporate replacement rates in their comparisons of the quality of benefit systems (Esping-Andersen, 1990) may need to re-assess their conclusions.

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15 Moreover, the real level of National Superannuation benefits fell by about nine per cent in the 1980s.

Table 9: Minimum Benefits for Single Older People, in $US: 1991

	Level in $US (PPPs)	Index of level	Components
Australia	6834	133	Age pension
Austria	6518	127	Social assistance
Belgium	6330	123	Old age pension
Canada	7344	143	Old age security, guaranteed income supplement
Denmark	6545	127	Old age pension
Finland	4647	90	National pension
France	6131	119	Retirement pension and social assistance
Germany	4813	93	Social assistance
Iceland	7520	146	Old age pension
Ireland	4727	92	Non-contributory pension
Italy	5770	112	Contributory pension
Luxembourg	11621	226	Revenue minimum garanti
Netherlands	7380	143	National assistance
New Zealand	6406	124	National superannuation
Norway	6067	118	Old age pension
Spain	3661	71	Non-contributory pension
Sweden	5861	114	Old age pension, housing allowance
Switzerland	4897	95	Old age pension, means-tested allowance
United Kingdom	5150	100	Retirement pension, income related benefits
United States	5160	100	SSI, food stamps

Source: Hatland, Øverbye and Vigran, 1993, and personal calculations for Australia, Canada, USA and New Zealand.

8 Conclusion

In summary, this paper has argued that replacement rates should be seen as limited indicators of the generosity or quality of systems of benefits. It seems likely that replacement rates may be useful indicators for changes over time in a benefit system within a specific country, but comparisons across countries are more fraught. Comparisons of benefit levels adjusted by PPPs suggests that previous rankings of basic benefit levels may be unreliable. Even within one country, the use of replacement rates as measures of the development of benefits should be tempered by an awareness of the possible changes that may be produced by shifts in the public/private mix or other factors affecting benefit adequacy.

It has also been argued that the use of replacement rates may be more appropriate when comparing minimum benefits, but comparisons of replacement rates for those at average or higher income levels need to take account of private and occupational pensions. The appropriate concept of replacement rates may vary with the type of benefits, since the income that will need to be replaced in retirement will differ from that which needs to be replaced when unemployed, for example. It is also important that comparisons of benefit replacement rates should take account of all components of benefit packages, as well as the costs that must be faced by those in work or others to whom beneficiaries are compared. This analysis has also shown that it is important to use multiple measures of benefit adequacy to complement replacement rates, including 'absolute' measures employing PPPs, as well as alternative relative measures based on GDP per head or household disposable income per capita.

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