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# EQUIVALENCE SCALE SENSITIVITY OF POVERTY STATISTICS FOR THE MEMBER STATES OF THE EUROPEAN COMMUNITY

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Using microdata from Household Budget Surveys of the Member States of the European Community, this paper examines the sensitivity of poverty statistics with respect to the choice of the equivalence scale. The results show that the ranking of the countries with respect to the overall poverty incidence is hardly affected when different equivalence scales are used. However, the composition of the poor population shows considerable changes when e.g. subjective equivalence scales are used instead of the OECD equivalence scale. The poverty incidence among specific household groups, such as single elderly and households with children, is particularly sensitive to the choice of the equivalence scale.

## 1. INTRODUCTION

To compare the levels of resources or the relative needs of households of different size and composition, the use of equivalence scales has become a common practice among social scientists. The rationale behind the use of equivalence scales is based on the simple fact that e.g. a six-person household cannot be expected to live as cheaply as a single person household, but, as a result of economies of scale, a six person household does not need six times the resources of a one person household to reach the same welfare level. There is an elaborate literature on equivalence scales, ranging from normative scales devised by experts and equivalence scales implied by the social security system in question to equivalence scales estimated from consumer demand models, and equivalence scales based on subjective welfare measurement (see e.g. Hagenaars, 1986; Buhmann *et al.*, 1988; Hagenaars, De Vos and Wunderink, 1993). In this paper we do not examine the theoretical problems and possibilities related to the determination of equivalence scales.[1] The main contribution of this paper is to show the sensitivity of poverty

*Note*: This paper is based on the report "Poverty Statistics in the Late 1980s: Research Based on Micro-data," by Aldi Hagenaars, Klaas de Vos and Asghar Zaidi. This report was written for the project "Living conditions of the Least Privileged in the European Community" under the auspices of Eurostat within the Poverty-3 programme of the European Commission, and published by Eurostat. The authors are grateful to Eurostat and the National Statistical Institutes for their efforts to make this research project possible. Comments from two anonymous referees are gratefully acknowledged.

The statistics presented in this paper are the results of research, of which the sole responsibility rests with the authors. The results do not necessarily reflect the views of national governments or the European Commission.

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[1]One important issue for the purpose of international comparisons is whether the equivalence scale should be equal for all countries or whether the scale should be based on the same methodology for all countries. For practical purposes the modified OECD scale used as the reference scale in our project is the same for all Members States, since it would have been difficult to persuade the European Commission and the various national governments to use different equivalence scales in different Member States. However, the subjective equivalence scales are by definition not the same in all countries, but—as much as possible—based on the same methodology in all countries.

statistics for all twelve Member States of the European Community to the choice of the equivalence scale.[2] Not only do we check whether the choice of equivalence scales affects the ranking of the Member States with respect to the incidence of poverty, but we also examine the changes in the composition of the poor population as a result of using different equivalence scales.

The results are extracted from a main report (Hagenaars, De Vos and Zaidi, 1994) which aims to provide the European Commission with comparable poverty statistics for the Member States of the European Community on the basis of micro-data from Household Budget Surveys. The research was commissioned by Eurostat, the Statistical Office of the European Community, within the framework of the Poverty 3 Programme of the European Commission.

The outline of this paper is as follows. In Section 2 we present a brief discussion of the data and concepts in use and their limitations, and in Section 3 we discuss the resulting figures. Section 4 concludes.

## 2. Concepts and Data

### 2.1. *The Concept of Poverty*

On the basis of a decision by the Council of Ministers of the European Community, the poverty definition in use throughout the research project discussed in this paper has been a relative one, defining the poor as persons or households "whose resources are so limited as to exclude them from the minimum acceptable way of life in the Member State in which they live." In view of the data, the concept of resources had to be limited to material resources, and it has been assumed that a household is excluded from the minimal acceptable way of life if its resources are below a certain percentage of the average level of resources in the Member State in question. As measure of resources we have used total expenditures, basically because income is not measured reliably in a number of the Household Budget Surveys involved (see Section 2.3). Conceptually, income may be preferable when one wants to infer whether a household is excluded from the minimal way of life—the well-known distinction between direct and income based measurement of poverty (Sen, 1981). On the other hand, expenditures might be a better measure of permanent or life-cycle income (Friedman, 1957; Modigliani and Brumberg, 1954), especially for those households whose income is highly unstable (e.g. households with self-employed heads).

In this paper, we analyze poverty statistics obtained by drawing the poverty line at half of the mean equivalent expenditures. Since this cut-off is essentially arbitrary, in the main report we also examine the sensitivity of the poverty statistics with respect to different cut-off percentages. The main conclusions are that the ranking of the countries and the composition of the poor population within a country remain largely unaffected when we draw the poverty line at different percentages of the mean.

[2]At the time research for this paper was carried out, the European Union was referred to as the European Community and it consisted of twelve Member States. Therefore, in this paper we refer to the twelve Member States of the European Community.

As measure of poverty we only use the poverty percentage or Head-count ratio. In the main report we also present results for other poverty indices such as the Poverty-gap ratio and the indices proposed by Foster, Greer and Thorbecke (1984) and Hagenaars (1986). The main conclusion from these results is that the poverty risk groups identified by the Head-count ratio remain largely unchanged when we use other poverty indices.

### 2.2. *Equivalence Scales*

In this paper we examine the sensitivity of the poverty statistics using three different equivalence scales. The first equivalence scale we use is the widely used equivalence scale devised by OECD experts (OECD, 1982) which implies that for every additional adult and for every person younger than 14 a household needs 0.7 and 0.5 times the resources of the first adult, respectively, to remain on the same welfare level. For developed countries, this scale is usually found to be quite steep, overestimating the needs of large households in comparison to small households. At the other extreme, we use equivalences scales based on subjective welfare measurement, which are usually found to be quite flat, underestimating the needs of large households. As much as possible, the subjective scales have been computed on the basis of the same data that have been used to compute the poverty statistics,[3] but for some countries we have had to rely on results from earlier research (Van Praag, Hagenaars and Van Weeren, 1982). As a result, the comparability of the results based on the subjective scales is questionable. The subjective equivalence scales used in this paper are presented in Table A1 in the appendix.

The third equivalence scale we use is a modification of the original OECD-scale taking an intermediate position between the steep OECD scale and the flat subjective scales. Instead of 0.7 and 0.5, the coefficients for this scale are 0.5 and 0.3 for additional adults and persons younger than 14, respectively.

It should be noted that the basic measurement unit for the poverty analysis is the household. Possible intrahousehold inequality is not taken into account, but all household members are assumed to have the same level of equivalent expenditures. When we present poverty statistics in terms of persons, these are based on the poverty status of the households.

### 2.3. *Data*

The research project reported on in this paper has been the first to have made use of micro-data for all Member States of the European Community. When this project started, the Household Budget Surveys were considered to be the most appropriate choice of micro-data. They were the only source of comparable micro-data available in all countries and considered to be representative for the populations in question. Table A2 in the appendix gives the numbers of observations in the surveys in the respective Member States. Considerable care has been taken to

[3]We thank Bernard van Praag and Rob Flik of the Rotterdam Institute of Population Economics (RIPE) for providing us the resulting equivalence scales.

correct for differences in definitions and methodology. Moreover, by the application of household weights (supplied with the data or derived from Labour Force Surveys), the representativity of the surveys was improved. Still, it should be noted that the comparability and reliability of the data is subject to some serious doubts. In particular, a comparison with National Accounts figures raises concerns about underestimation of total expenditures (to a varying degree) in nine out of twelve Member States, and overestimation in the three remaining countries.[4]

In five Member States, total average income as reported in the Household Budget Surveys is lower than average total expenditures, suggesting a considerable degree of underreporting of income in these Member States.[5] Moreover, the main focus of most of the Household Budget Surveys is on expenditures. In some countries the questionnaire does not contain a detailed set of questions on income, and/or income data are missing for a non-negligible part of the respondents. That is why in this paper, as in our main report, the sensitivity analysis is based on expenditure data.

As the variable representing total household expenditures we have included all expenditures (except mortgage payments) as well as imputed rent for owner-occupied dwellings, income in kind and self-supplied goods.[6] Especially with respect to the determination of imputed rent some differences remain between the respective Member States.[7] To correct for different measurement periods, all expenditures have been translated into yearly amounts. For the household type definition, the head of the household is defined as the member who brings in the largest share of total household resources and children are defined as the offspring of the head (and/or spouse) irrespective of age.

## 3. RESULTS

### 3.1. *Overall Poverty Rates*

Table 1 (and Figure 1) gives the overall percentages and numbers of poor households, based on the poverty threshold fixed at 50 percent of mean equivalent expenditures using the three equivalence scales discussed above. It appears that the differences in the poverty incidence between the OECD scale and the modified

[4]It should be noted that the reliability and comparability of the National Accounts figures may also be questioned.

[5]For individual households, total expenditures may be higher than total income through the use of credit and loans (e.g. for the purchase of durables). However, for the countries as a whole, positive savings should have been found in all cases.

[6]All variables pertaining to income in kind and self-supplied goods (as valued by the respondents) available in the micro-data have been included in the definition of total expenditures. To record total expenditures, each household maintains both intensive and non-intensive types of diaries for different recording periods. Generally, the recording periods range from two weeks for food expenditures to the whole year for other types of expenditures. In most surveys the recording is on procurement (as distinct from payment or consumption) basis.

[7]In all Member States except France and Denmark, imputed rent was included in the micro-data, and was mostly based on a direct evaluation of the rent owners would have paid for their house. In France, imputed rent has been estimated by using the results of a regression of rent for tenant households on variables such as surface of the accommodation, region of residence, number of rooms, year of construction and total expenditures net of rent. In Denmark, following the practice of Statistics Denmark, imputed rent has been calculated as 2.5 percent of the value of the house.

OECD scale are fairly limited. The subjective equivalence scales in general give rise to notabily higher poverty rates. All in all, 17.6 million households were counted as poor in the Member States of the European Community based on the OECD scale, as against 19.2 million households according to the modified scale and 24.3 million using the subjective scales. Since only one figure on the incidence of poverty is usually used as the basis for policy discussions in the European Commission, these results should serve as a warning not to attach too much value to the absolute figures. Obviously, it is essential to understand the procedures involved in the measurement of poverty before using the figures in policy debates.

TABLE 1

PERCENTAGES AND NUMBERS OF POOR HOUSEHOLDS USING THREE DIFFERENT EQUIVALENCE SCALES

(poverty line: 50% of mean equivalent expenditures)

| | OECD | | Mod. OECD | | Subjective | |
|---|---|---|---|---|---|---|
| Member State | % | Number (1,000) | % | Number (1,000) | % | Number (1,000) |
| 1. Portugal ('89) | 25.2 | 797 | 26.5 | 836 | 29.2 | 921 |
| 2. Italy ('88) | 20.6 | 4,208 | 22.0 | 4,494 | 24.8 | 5,066 |
| 3. Greece ('88) | 20.6 | 706 | 20.8 | 711 | 21.6 | 738 |
| 4. Spain ('88) | 16.7 | 1,833 | 17.5 | 1,920 | 21.2 | 2,326 |
| 5. United Kingdom ('88) | 14.6 | 3,289 | 17.0 | 3,819 | 23.3 | 5,234 |
| 6. Ireland ('87) | 16.9 | 171 | 16.4 | 166 | 20.0 | 202 |
| 7. France ('89) | 14.0 | 3,042 | 14.9 | 3,238 | 17.8 | 3,868 |
| 8. Germany ('88) | 10.8 | 2,938 | 12.0 | 3,250 | 17.3 | 4,685 |
| 9. Luxembourg ('87) | 8.8 | 11 | 9.2 | 12 | 11.2 | 15 |
| 10. Belgium ('88) | 6.1 | 241 | 6.6 | 261 | 8.3 | 328 |
| 11. Netherlands ('88) | 4.3 | 252 | 6.2 | 366 | 12.7 | 750 |
| 12. Denmark ('87) | 3.6 | 84 | 4.2 | 98 | 5.5 | 128 |
| EUR-12 | | 17,570 | | 19,170 | | 24,261 |

Concentrating on the modified OECD scale, we can distinguish five groups of Member States. Portugal has clearly the highest poverty rate, Greece and Italy are countries with poverty rates above the average, and Spain, the United Kingdom, Ireland and France take up an intermediate position, with poverty rates close to the overall average. Germany has a poverty rate below the average, and Luxembourg, Belgium, the Netherlands and Denmark have the lowest poverty rates. This ranking remains unaffected when we look at the figures using the original OECD scale, although there are a few changes in the order within the group of countries with poverty rates close to the average. The largest differences in the poverty incidence are found in the Netherlands and the U.K. Ireland is the only country where the poverty rate is slightly higher when we use the original OECD scale instead of the modified scale.

An explanation why the Netherlands and the U.K. show relatively large decreases in the poverty rate when we move from the modified to the original OECD scale, while Ireland shows an increase, can only be given after a detailed look at the underlying changes in the respective household size groups. In general, using a steeper equivalence scale results in lower average expenditures per equivalent adult, and hence in a lower poverty line. Since the expenditures per equivalent

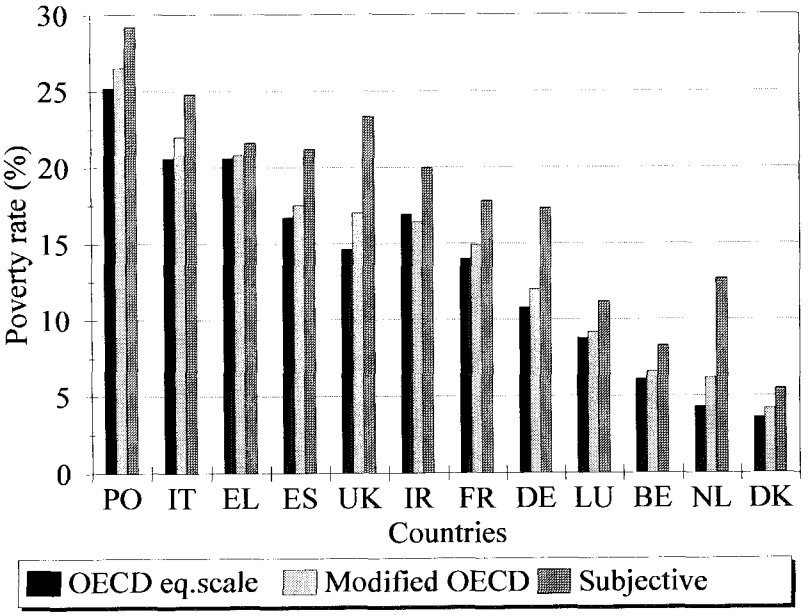


Figure 1. Equivalence Scale Sensitivity of Overall Poverty Rates (households)

adult also decrease, except for single person households, the poverty incidence in small households will decrease while it will increase for large households. The effect on the total size of the poor population will depend on the distribution of expenditures within the household size groups. If, using the modified OECD equivalence scale, relatively many small households are close to but below the poverty line, the poverty incidence will decrease relatively fast in that group when the original OECD scale is used. On the other hand, if there are relatively many large households close to but above the poverty line using the modified scale, the poverty incidence will increase relatively fast in that group. The net effect on the overall poverty incidence will also depend on the relative sizes of the respective household size groups.

When we move from the figures based on the modified OECD scale to the poverty rates using the subjective scales, the differences are relatively large, compared to the results of shifting to the original OECD scale. For all countries, the subjective scales give rise to the highest poverty rates, but the increase varies from less than 1 percent in Greece to more than 6 percent in the Netherlands and the U.K. As a result, the subjective scales produce a ranking in which Portugal still has the highest poverty rate, followed by Italy, the U.K. Greece, Spain and Ireland. France and Germany now take up the middle positions, and the Netherlands, Luxembourg and Belgium follow with below average poverty rates. Denmark clearly stands out as the country with the lowest poverty rate according to the subjective scales. It should however be noted that these results are based on subjective scales which were not in all cases computed on the basis of data for the same year. Moreover, corrections for the problems involved in the computations of these scales (see e.g. Kapteyn, Kooreman and Willemse, 1988) might also lead to different conclusions.

Whereas the number of poor households rises as we move from the OECD scale to the modified OECD scale and on to the subjective scales, the number of poor *persons* (computed as the number of persons who are members of poor households) decreases, as can be seen from Table 2 (and Figure 2). As noted above, allowing for higher economies of scale implies that more small households and fewer large households are counted as poor, so that the number of persons counted as poor will decrease even though the number of poor households increases. All in all, 52 million persons are counted as poor according to the OECD scale, as against 48.8 according to the modified scale and 46.5 according to the subjective scales. Looking at the figures based on the modified OECD scale, we see that the ranking of the countries on the basis of poverty rates in terms of households remains more or less intact for the poverty rates in terms of persons. The main exception is that Belgium and Luxembourg have percentages of poor persons closer to that of Germany than to those of the Netherlands and Denmark. Belgium and Luxembourg are the only countries with a poverty rate in terms of persons which is higher than the poverty rate in terms of households, suggesting that poverty is concentrated in large households in these countries, whereas small households appear to be overrepresented among the poor in the other Member States.

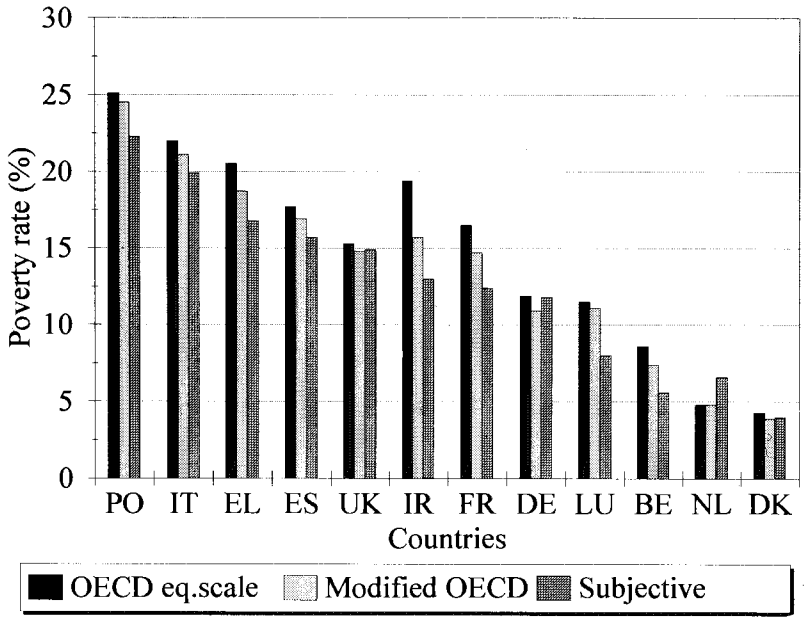


Figure 2. Equivalence Scale Sensitivity of Overall Poverty Rates (persons)

The differences with the percentages of poor persons according to the original OECD scale are again fairly limited. The largest difference is found in Ireland, which appears to move from the group of countries with average poverty rates to the countries with above average poverty rates. Compared to the poverty rates in terms of households, the differences between the percentages of poor persons according to the modified OECD scale and the subjective scales are also quite

TABLE 2

PERCENTAGES AND NUMBERS OF POOR PERSONS USING THREE DIFFERENT EQUIVALENCE SCALES

(poverty line: 50% of mean equivalent expenditures)

| | OECD | | Mod. OECD | | Subjective | |
|---|---|---|---|---|---|---|
| | % | Number (1,000) | % | Number (1,000) | % | Number (1,000) |
| 1. Portugal ('89) | 25.1 | 2,586 | 24.5 | 2,525 | 22.3 | 2,298 |
| 2. Italy ('88) | 22.0 | 12,628 | 21.1 | 12,111 | 19.9 | 11,422 |
| 3. Greece ('88) | 20.5 | 2,048 | 18.7 | 1,868 | 16.8 | 1,678 |
| 4. Spain ('88) | 17.7 | 6,856 | 16.9 | 6,546 | 15.7 | 6,081 |
| 5. United Kingdom ('88) | 15.3 | 8,721 | 14.8 | 8,436 | 14.9 | 8,493 |
| 6. Ireland ('87) | 19.4 | 687 | 15.7 | 556 | 13.0 | 460 |
| 7. France ('89) | 16.5 | 9,243 | 14.7 | 8,234 | 12.4 | 6,946 |
| 8. Germany ('88) | 11.9 | 7,287 | 10.9 | 6,675 | 11.8 | 7,226 |
| 9. Luxembourg ('87) | 11.5 | 42 | 11.1 | 41 | 8.0 | 30 |
| 10. Belgium ('88) | 8.6 | 848 | 7.4 | 729 | 5.6 | 552 |
| 11. Netherlands ('88) | 4.8 | 706 | 4.8 | 706 | 6.6 | 971 |
| 12. Denmark ('87) | 4.3 | 220 | 3.9 | 200 | 4.0 | 205 |
| EUR-12 | | 51,873 | | 48,628 | | 46,362 |

small. The Netherlands, and to a lesser extent Germany, Denmark and the U.K. are the only countries in which the poverty rate in terms of persons increases when we move from the modified OECD scale to the subjective scales. Still, the ranking of the Member States is only marginally affected. Again, differences in the sizes and in the distributions of the respective household size groups between the various countries will underlie the differential effects of moving to a different equivalence scale.

### 3.2. *Poverty Rates Differentiated According to Characteristics of Households and Persons*

As expected, the differences between the overall poverty rates based on the three equivalence scales are accompanied by much larger differences in the poverty rates of households with different size and composition (Table 3). In particular, we see a shift of poverty from large households according to the (steep) OECD scale to small households according to the (flat) subjective scales. Most straightforwardly, this shift can be established when we differentiate according to household size. Whereas the modified OECD scale in most countries gives rise to a U-shaped pattern with above average poverty rates both for one person households and for households with six or more members, the original OECD scale usually finds the highest poverty rates in the latter household group, whereas the subjective scales imply quite high poverty rates among small households. Translated to the differentiation according to household type we find that couples with four or more children are especially at risk of being poor when we use the OECD scale to make resources comparable, while single persons older than 65 exhibit very high poverty rates on the basis of the subjective scales. Single parent households in most countries remain a group with above average poverty rates no matter which equivalence

scale we use, although obviously there will also be a shift from large to small households in the composition of poor within this group.

Differentiated according to the economic situation of the households the shift of poverty from large to small households reflects itself in a shift to households without members in paid employment. Although in most countries this group already has above average poverty rates according to the OECD scale, it has unvaryingly the highest poverty rates when the subjective scales are used. The shift to small households is also reflected in a shift to older persons, as can be seen from a breakdown of the poverty rates in terms of persons according to the age of the persons.[8] Whereas children (and especially persons between 14 and 16) are a risk group with above average poverty rates in quite a few countries when we use the OECD scale, and to a lesser extent when the modified OECD scale is applied, only in Ireland children have a poverty rate (slightly) above the average on the basis of the subjective scales. On the other hand, the elderly (especially persons of 75 and older) have poverty rates above the average in most of the Member States when we use the OECD scale and the modified OECD scale, but they have clearly the highest poverty rates when the subjective scales are the basis of the computations.

Alternatively, the effects of using different equivalence scales may also be observed by directly looking at the composition of the poor population. We have included the household composition according to the characteristic which is likely to be most affected, viz. household size, in Table 4. Although the household size composition of the poor population varies considerably among the twelve countries, largely dependent on the household size composition of the total population, in all countries the shift to small households when moving from the OECD scale to the subjective scale is noticeable. According to the subjective scale one person households make up a majority of the poor population in seven countries, and one and two person households make up at least 70 percent of the poor in all but two countries. Large households are overrepresented according to the OECD scale, with the highest percentage in Ireland, where they also have the largest share in the total population.

The results of Tables 3 and 4 also illustrate the remarks in the previous section with respect to the explanation of the differential effects of e.g. going from the modified OECD-scale to the original OECD-scale. We noted that the decrease was particularly strong in the U.K. and the Netherlands, and it can be computed from Tables 3 and 4 that in these countries the effect on the overall poverty rates of the decrease in the poverty rate for single person households is the largest. However, compared to e.g. France and Germany, the effect is not much larger in the Netherlands, but in France and Germany this is compensated for by a relatively large effect on the overall poverty rate of the increase in larger household size groups.

[8]Results differentiating the poverty statistics in terms of persons according to the age of the persons, and differentiating the poverty statistics in terms of households according to the economic situation of the households are available from the authors upon request. The poverty statistics in terms of persons differentiated according to age groups have been calculated by assessing the poverty status of the persons by the poverty status of the household he or she belongs to. Once the poverty status of all persons is known, we classify all persons according to age group and compute the poverty rates in different age groups.

TABLE 3

POVERTY RATES USING THREE DIFFERENT EQUIVALENCE SCALES: BREAKDOWN BY HOUSEHOLD TYPE AND HOUSEHOLD SIZE

| Poverty Statistics in Terms of Households | 1. Portugal ('89) | | | 2. Italy ('88) | | | 3. Greece ('88) | | | 4. Spain ('88) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OECD | Mod. | Subj. | OECD | Mod. | Subj. | OECD | Mod. | Subj. | OECD | Mod. | Subj. |
| Total | 25.2 | 26.5 | 29.2 | 20.6 | 22.0 | 24.8 | 20.6 | 20.8 | 21.6 | 16.7 | 17.5 | 21.2 |
| Household type | | | | | | | | | | | | |
| 1. One person below 65 | 23.4 | 30.5 | 50.7 | 10.7 | 16.9 | 28.4 | 11.1 | 16.4 | 23.9 | 13.2 | 20.4 | 43.3 |
| 2. One person 65 or above | 47.2 | 59.9 | 81.4 | 28.7 | 40.3 | 59.2 | 33.1 | 44.5 | 57.7 | 25.8 | 37.9 | 70.8 |
| 3. Couple | 28.6 | 32.1 | 42.2 | 20.6 | 23.5 | 28.6 | 27.5 | 29.0 | 32.7 | 17.2 | 20.6 | 34.1 |
| 4. Couple with one child | 13.4 | 13.8 | 14.3 | 14.0 | 13.7 | 14.0 | 13.2 | 12.1 | 10.8 | 11.2 | 12.5 | 16.1 |
| 5. Couple with two children | 14.1 | 12.7 | 10.5 | 19.8 | 17.0 | 14.5 | 16.0 | 12.3 | 9.5 | 10.4 | 9.7 | 8.5 |
| 6. Couple with three children | 24.4 | 20.8 | 13.4 | 30.7 | 26.1 | 17.1 | 18.1 | 13.5 | 10.4 | 18.7 | 16.2 | 12.0 |
| 7. Couple with four or more children | 44.2 | 37.6 | 19.7 | 51.5 | 42.9 | 24.1 | 35.0 | 27.6 | 16.0 | 27.7 | 22.7 | 11.0 |
| 8. Mono-parental household | 27.2 | 27.8 | 31.8 | 20.9 | 22.9 | 25.9 | 17.1 | 17.5 | 19.2 | 20.7 | 22.8 | 29.1 |
| 9. Other type of household | 31.9 | 30.3 | 23.0 | 23.0 | 21.6 | 18.4 | 25.8 | 23.4 | 17.9 | 20.5 | 19.5 | 16.3 |
| Size of the household | | | | | | | | | | | | |
| 1. One member | 38.9 | 49.6 | 70.6 | 20.4 | 29.6 | 45.0 | 21.6 | 29.8 | 40.0 | 20.6 | 30.7 | 59.5 |
| 2. Two members | 28.3 | 31.7 | 41.7 | 20.3 | 23.2 | 28.6 | 25.5 | 27.1 | 30.7 | 17.8 | 21.4 | 35.0 |
| 3. Three members | 17.5 | 17.9 | 18.9 | 15.1 | 14.8 | 14.8 | 15.2 | 14.2 | 13.0 | 12.7 | 13.9 | 17.6 |
| 4. Four members | 16.9 | 15.3 | 12.6 | 20.2 | 17.5 | 14.6 | 16.3 | 12.9 | 9.8 | 11.1 | 10.3 | 9.2 |
| 5. Five members | 25.6 | 22.7 | 14.7 | 29.7 | 25.6 | 16.8 | 21.6 | 16.9 | 12.2 | 18.9 | 16.7 | 11.4 |
| 6. Six or more members | 44.1 | 38.4 | 16.8 | 43.5 | 36.2 | 19.3 | 36.5 | 29.3 | 14.9 | 29.1 | 23.6 | 10.3 |

| Poverty Statistics in Terms of Households | 5. United Kingdom ('88) | | | 6. Ireland ('87) | | | 7. France ('89) | | | 8. Germany ('88) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OECD | Mod. | Subj. | OECD | Mod. | Subj. | OECD | Mod. | Subj. | OECD | Mod. | Subj. |
| Total | 14.6 | 17.0 | 23.3 | 16.9 | 16.4 | 20.0 | 14.0 | 14.9 | 17.8 | 10.8 | 12.0 | 17.3 |
| Household type | | | | | | | | | | | | |
| 1. One person below 65 | 9.1 | 16.3 | 36.2 | 13.7 | 20.7 | 40.1 | 8.7 | 13.6 | 25.7 | 7.2 | 13.0 | 30.2 |
| 2. One person 65 or above | 23.7 | 40.2 | 73.3 | 23.2 | 35.7 | 64.3 | 22.6 | 33.8 | 53.1 | 14.6 | 21.7 | 40.7 |
| 3. Couple | 12.0 | 13.7 | 17.7 | 9.1 | 11.0 | 17.1 | 8.8 | 10.2 | 12.9 | 8.0 | 8.7 | 9.9 |
| 4. Couple with one child | 8.5 | 8.0 | 6.1 | 9.7 | 8.5 | 9.6 | 9.3 | 9.3 | 7.3 | 7.6 | 6.8 | 5.0 |
| 5. Couple with two children | 11.8 | 8.5 | 4.3 | 11.9 | 8.6 | 9.4 | 11.8 | 9.1 | 5.9 | 12.7 | 7.6 | 4.0 |
| 6. Couple with three children | 20.9 | 15.2 | 5.0 | 18.0 | 12.1 | 9.6 | 22.6 | 15.7 | 6.6 | 17.9 | 13.4 | 6.0 |
| 7. Couple with four or more children | 39.5 | 28.9 | 8.1 | 29.9 | 22.3 | 8.8 | 49.6 | 36.9 | 9.5 | 30.1 | 24.4 | 5.1 |
| 8. Mono-parental household | 25.1 | 25.3 | 32.8 | 24.5 | 23.8 | 29.3 | 18.8 | 18.3 | 23.0 | 25.2 | 24.0 | 29.2 |
| 9. Other type of household | 11.4 | 11.2 | 9.8 | 13.9 | 12.5 | 11.8 | 20.0 | 17.7 | 12.4 | 11.5 | 9.4 | 7.0 |
| Size of the household | | | | | | | | | | | | |
| 1. One member | 16.9 | 29.1 | 56.0 | 18.2 | 27.9 | 51.8 | 14.9 | 22.6 | 37.9 | 9.8 | 16.0 | 33.8 |
| 2. Two members | 12.5 | 14.4 | 19.6 | 12.8 | 15.2 | 22.0 | 9.7 | 11.2 | 14.4 | 9.9 | 10.6 | 12.7 |
| 3. Three members | 11.7 | 10.6 | 9.4 | 11.5 | 10.3 | 11.5 | 10.4 | 9.4 | 9.2 | 9.4 | 8.3 | 6.5 |
| 4. Four members | 13.0 | 9.9 | 5.5 | 12.9 | 9.6 | 10.1 | 13.2 | 10.2 | 6.7 | 13.6 | 8.2 | 4.6 |
| 5. Five members | 20.3 | 14.9 | 5.1 | 17.2 | 11.8 | 9.4 | 22.2 | 15.8 | 6.6 | 19.0 | 13.9 | 6.2 |
| 6. Six or more members | 37.9 | 28.4 | 6.6 | 28.5 | 20.6 | 8.0 | 51.1 | 37.9 | 9.2 | 31.4 | 24.2 | 3.7 |

TABLE 3—continued

| Poverty Statistics in Terms of Households | 9. Luxembourg ('87) | | | 10. Belgium ('88) | | | 11. Netherlands ('88) | | | 12. Denmark ('87) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OECD | Mod. | Subj. | OECD | Mod. | Subj. | OECD | Mod. | Subj. | OECD | Mod. | Subj. |
| Total | 8.8 | 9.2 | 11.2 | 6.1 | 6.6 | 8.3 | 4.3 | 6.2 | 12.7 | 3.6 | 4.2 | 5.5 |
| Household type | | | | | | | | | | | | |
| 1. One person below 65 | 1.4 | 4.9 | 13.5 | 3.4 | 8.0 | 18.2 | 2.4 | 8.5 | 30.6 | 2.9 | 5.6 | 9.2 |
| 2. One person 65 or above | 6.1 | 11.2 | 36.6 | 2.7 | 7.9 | 18.0 | 7.4 | 20.6 | 46.6 | 2.4 | 5.8 | 11.8 |
| 3. Couple | 3.5 | 4.3 | 8.0 | 2.9 | 3.3 | 4.5 | 3.3 | 4.2 | 6.6 | 4.0 | 4.4 | 4.5 |
| 4. Couple with one child | 5.9 | 5.6 | 4.9 | 6.0 | 4.5 | 3.6 | 2.8 | 1.7 | 1.7 | 2.4 | 1.7 | 0.7 |
| 5. Couple with two children | 12.4 | 10.1 | 5.8 | 7.1 | 4.7 | 2.2 | 3.5 | 2.3 | 0.5 | 3.5 | 2.5 | 1.8 |
| 6. Couple with three children | 23.5 | 19.5 | 5.8 | 13.2 | 10.2 | 2.2 | 4.5 | 3.5 | 0.9 | 10.4 | 5.5 | 4.0 |
| 7. Couple with four or more children | 25.0 | 25.0 | 0.0 | 29.8 | 21.3 | 2.4 | 19.1 | 8.0 | 0.0 | 25.6 | 25.6 | 6.3 |
| 8. Mono-parental household | 17.2 | 17.5 | 19.5 | 15.4 | 14.9 | 17.1 | 15.7 | 14.0 | 15.8 | 3.8 | 2.7 | 3.4 |
| 9. Other type of household | 16.5 | 14.8 | 6.5 | 13.6 | 9.8 | 4.3 | 3.6 | 3.2 | 0.5 | 0.0 | 0.0 | 0.0 |
| Size of the household | | | | | | | | | | | | |
| 1. One member | 3.4 | 7.6 | 23.3 | 3.1 | 8.0 | 18.1 | 3.9 | 12.0 | 35.3 | 2.7 | 5.7 | 10.1 |
| 2. Two members | 4.3 | 6.0 | 9.9 | 3.3 | 3.8 | 5.4 | 6.1 | 5.1 | 7.3 | 3.5 | 3.9 | 4.2 |
| 3. Three members | 8.8 | 8.3 | 6.6 | 7.3 | 5.5 | 4.8 | 3.7 | 2.0 | 2.5 | 2.4 | 1.9 | 1.0 |
| 4. Four members | 13.4 | 11.1 | 6.4 | 8.4 | 5.7 | 2.5 | 4.3 | 3.4 | 1.2 | 4.1 | 3.0 | 2.3 |
| 5. Five members | 23.1 | 19.3 | 5.9 | 13.4 | 10.5 | 2.0 | 4.1 | 3.0 | 0.6 | 11.3 | 5.3 | 3.9 |
| 6. Six or more members | 29.3 | 21.6 | 0.0 | 31.6 | 25.1 | 4.9 | 21.0 | 11.7 | 0.0 | 25.6 | 25.6 | 6.3 |

TABLE 4

HOUSEHOLD SIZE COMPOSITION OF TOTAL POPULATION AND POOR POPULATION ACCORDING TO THREE EQUIVALENCE SCALES

(households, row total = 100%)

| Member State | Population | Household size 1 | 2 | 3 | 4 | 5 | 6 or more |
|---|---|---|---|---|---|---|---|
| 1. Portugal | Total population | 11.3 | 27.9 | 23.9 | 21.7 | 9.0 | 6.1 |
| | Poor: OECD scale | 17.5 | 31.4 | 16.6 | 14.6 | 9.2 | 10.8 |
| | Poor: modified OECD scale | 21.3 | 33.4 | 16.1 | 12.6 | 7.7 | 8.9 |
| | Poor: subjective scale | 27.4 | 39.8 | 15.4 | 9.3 | 4.6 | 3.5 |
| 2. Italy | Total population | 21.1 | 24.1 | 22.2 | 22.1 | 7.3 | 3.1 |
| | Poor: OECD scale | 21.0 | 23.8 | 16.3 | 21.7 | 10.6 | 6.6 |
| | Poor: modified OECD scale | 28.4 | 25.4 | 15.0 | 17.6 | 8.5 | 5.1 |
| | Poor: subjective scale | 38.4 | 27.9 | 13.3 | 13.0 | 5.0 | 2.4 |
| 3. Greece | Total population | 17.3 | 26.3 | 20.7 | 24.1 | 8.0 | 3.6 |
| | Poor: OECD scale | 18.2 | 32.6 | 15.3 | 19.1 | 8.4 | 6.4 |
| | Poor: modified OECD scale | 24.9 | 34.4 | 14.2 | 15.0 | 6.5 | 5.1 |
| | Poor: subjective scale | 32.1 | 37.5 | 12.5 | 11.0 | 4.5 | 2.5 |
| 4. Spain | Total population | 8.9 | 20.7 | 21.3 | 24.1 | 14.7 | 10.3 |
| | Poor: OECD scale | 11.0 | 22.1 | 16.3 | 16.0 | 16.7 | 17.9 |
| | Poor: modified OECD scale | 15.6 | 25.3 | 17.0 | 14.2 | 14.1 | 13.8 |
| | Poor: subjective scale | 24.9 | 34.1 | 17.7 | 10.4 | 17.9 | 5.0 |
| 5. United Kingdom | Total population | 24.6 | 33.5 | 17.4 | 16.5 | 5.8 | 2.3 |
| | Poor: OECD scale | 28.5 | 28.6 | 14.0 | 14.8 | 8.1 | 6.0 |
| | Poor: modified OECD scale | 42.2 | 28.4 | 10.9 | 9.6 | 5.1 | 3.9 |
| | Poor: subjective scale | 59.0 | 28.2 | 7.0 | 3.9 | 1.3 | 0.7 |
| 6. Ireland | Total population | 18.5 | 20.4 | 14.3 | 16.5 | 13.7 | 16.6 |
| | Poor: OECD scale | 20.0 | 15.5 | 9.8 | 12.6 | 14.0 | 28.0 |
| | Poor: modified OECD scale | 31.6 | 19.0 | 9.0 | 9.7 | 9.9 | 20.9 |
| | Poor: subjective scale | 47.9 | 22.4 | 8.2 | 8.4 | 6.5 | 6.6 |
| 7. France | Total population | 26.6 | 30.1 | 17.4 | 15.9 | 6.7 | 3.3 |
| | Poor: OECD scale | 28.4 | 20.9 | 13.0 | 15.0 | 10.7 | 12.1 |
| | Poor: modified OECD scale | 40.2 | 22.6 | 10.9 | 10.8 | 7.1 | 8.4 |
| | Poor: subjective scale | 56.5 | 24.3 | 9.0 | 6.0 | 2.5 | 1.7 |
| 8. Germany | Total population | 33.6 | 31.3 | 17.4 | 12.8 | 4.0 | 0.9 |
| | Poor: OECD scale | 30.4 | 28.6 | 15.1 | 16.2 | 7.1 | 2.6 |
| | Poor: modified OECD scale | 45.0 | 27.7 | 12.1 | 8.7 | 4.7 | 1.8 |
| | Poor: subjective scale | 65.5 | 22.9 | 6.5 | 3.4 | 1.5 | 0.2 |
| 9. Luxembourg | Total population | 24.0 | 26.8 | 21.2 | 17.6 | 6.4 | 3.9 |
| | Poor: OECD scale | 9.3 | 13.1 | 21.2 | 26.8 | 16.8 | 12.9 |
| | Poor: modified OECD scale | 19.7 | 17.5 | 19.1 | 21.2 | 13.5 | 9.1 |
| | Poor: subjective scale | 50.2 | 23.8 | 12.6 | 10.1 | 3.4 | 0.0 |
| 10. Belgium | Total population | 29.1 | 28.4 | 18.5 | 15.4 | 5.9 | 2.7 |
| | Poor: OECD scale | 14.7 | 15.4 | 21.9 | 21.0 | 13.0 | 13.9 |
| | Poor: modified OECD scale | 35.2 | 16.4 | 15.5 | 13.2 | 9.4 | 10.3 |
| | Poor: subjective scale | 63.4 | 18.4 | 10.5 | 4.7 | 1.4 | 1.6 |
| 11. The Netherlands | Total population | 27.8 | 30.7 | 15.1 | 18.2 | 6.3 | 2.0 |
| | Poor: OECD scale | 24.8 | 28.9 | 13.0 | 17.9 | 5.9 | 9.6 |
| | Poor: modified OECD scale | 53.3 | 25.2 | 4.8 | 9.9 | 3.0 | 3.7 |
| | Poor: subjective scale | 77.3 | 17.7 | 3.0 | 1.7 | 0.3 | 0.0 |
| 12. Denmark | Total population | 34.7 | 33.4 | 14.0 | 13.6 | 4.0 | 0.4 |
| | Poor: OECD scale | 26.6 | 33.0 | 9.5 | 15.7 | 12.6 | 2.6 |
| | Poor: modified OECD scale | 46.4 | 30.7 | 6.1 | 9.6 | 4.9 | 2.2 |
| | Poor: subjective scale | 63.2 | 25.2 | 2.6 | 5.7 | 2.8 | 0.4 |

## 4. DISCUSSION AND CONCLUSION

In this paper we have presented empirical results of using three different equivalence scales to derive poverty statistics for the Member States of the European Community. It has appeared that the size and particularly the composition

of the poor population is quite sensitive to the choice of the equivalence scales. Large households are overrepresented when a steep scale is used, and small households are overrepresented when a flat scale is used. The ranking of the Member States in terms of the poverty incidence remains largely unaffected by the choice of the equivalence scale.[9]

Since the final answer to the question how equivalence scales should be determined cannot be given, the results of this paper are useful in providing poverty statistics for three equivalence scales, of which the two extremes—the OECD scale and the subjective scales—can probably be considered as upper and lower bounds on the values the equivalence scale can plausibly take. As a pragmatic choice, the modified OECD scale appears to be a reasonable compromise. The poverty statistics presented in this paper would seem to make up a plausible confidence interval for the actual size and composition of the poor population, given the choice of the poverty definition, as well as a plausible estimate of their most likely value. Still, it should be acknowledged that this confidence interval is quite wide. Moreover, the results are based on a number of choices, such as using total expenditures as the measure of resources, using households as the measurement unit, and taking a percentage of mean equivalent expenditures as the poverty cut-off. In particular, it should be noted that we only differentiate the equivalence scale with respect to household size and between persons younger and older than 14 (OECD-scale and modified OECD-scale only). Finally, unavoidably, there are differences with respect to the quality and representativeness of the data from the various Member States.

For policy-makers, probably the main lesson from the research reported in this paper is that they should try to overcome their desire for one simplifying statistic (such as the number of poor in the EC). The results confirm the importance of sensitivity analysis with respect to the equivalence scale in use in the absence of one undisputed equivalence scale, particularly in the identification of the poverty risk groups.

## References


Buhmann, B., L. Rainwater, G. Schmaus, and T. M. Smeeding, Equivalence Scales, Well-being, Inequality, and Poverty: Sensitivity Estimates Across Ten Countries Using the Luxembourg Income Study (LIS) Database, *The Review of Income and Wealth*, Series 34, 115–42, June 1988.

Burkhauser, R. V., T. M. Smeeding, and J. Merz, Relative Inequality and Poverty in Germany and the United States Using Alternative Equivalence Scales, *Luxembourg Income Study Working Paper No. 117*, Luxembourg, 1994.

Foster, J., J. Greer and E. Thorbecke, A Class of Decomposable Poverty Measures, *Econometrica*, 52, 761–67, 1984.

Friedman, M., *A Theory of the Consumption Function*, Princeton University Press, Princeton, 1957.

Hagenaars, A. J. M., *The Perception of Poverty*, North-Holland, Amsterdam, 1986.

Hagenaars, A. J. M., K. De Vos and S. R. Wunderink, Family Equivalence Scales, Discussion Paper, Erasmus University, Department of Economic Sociology and Psychology, 1992.

Hagenaars, A. J. M., K. De Vos and M. A. Zaidi, *Poverty Statistics in the Late 1980s: Research Based on Micro-data*, Study carried out for Eurostat, Office for Official Publications of the European Community, Luxembourg, 1994.


[9]Although based on different equivalence scales and different poverty definitions, the result that the ranking is unaffected but the composition changes considerably is consistent with the results of Burkhauser *et al.* (1994), who compare poverty in the U.S. and Germany.

Kapteyn, A., P. Kooreman, and R. J. Willemse, Some Methodological Issues in the Implementation of Subjective Poverty Definitions, *The Journal of Human Resources*, 23, 222–42, 1988.
Modigliani, F. and R. Brumberg, Utility Analysis and the Consumption Function: an Interpretation of Cross-section Data, in K. K. Kurihara K. K. (ed.), *Post-Keynesian Economics*, pp. 388–436, Rutgers University Press, New Brunswick, 1954.
OECD, *The OECD List of Social Indicators*, Organisation for Economic Cooperation and Development, Paris, 1982.
Sen, A. K., *Poverty and Famines: An Essay on Entitlement and Deprivation*, Clarendon Press, Oxford, 1981.
Van Praag, B. M. S., A. J. M. Hagenaars, and J. van Weeren, Poverty in Europe *The Review of Income and Wealth*, Series 28, 345–59, 1982.

## APPENDIX: TABLES

TABLE A1

HOUSEHOLD BUDGET SURVEYS: SAMPLE SIZES IN TERMS OF HOUSEHOLDS

| Country | Year | Number of observations |
|---|---|---|
| 1. Portugal | 1989 | 10,777 |
| 2. Italy | 1988 | 34,501 |
| 3. Greece | 1988 | 6,489 |
| 4. Spain | 1988 | 9,080 |
| 5. United Kingdom | 1988 | 7,265 |
| 6. Ireland | 1987 | 7,705 |
| 7. France | 1989 | 9,038 |
| 8. Germany | 1988 | 43,757 |
| 9. Luxembourg | 1987 | 2,760 |
| 10. Belgium | 1987-88 | 3,315 |
| 11. Netherlands | 1988 | 1,950 |
| 12. Denmark | 1987 | 2,232 |

TABLE A2

SUBJECTIVE EQUIVALENCE SCALES

| | Household Size | | | | | |
|---|---|---|---|---|---|---|
| Country | 1 | 2 | 3 | 4 | 5 | 6 |
| Portugal, Spain, Luxembourg[1] | 1.000 | 1.163 | 1.271 | 1.353 | 1.444 | 1.499 |
| Italy[2] | 1.000 | 1.293 | 1.503 | 1.673 | 1.817 | 1.944 |
| Greece[2] | 1.000 | 1.333 | 1.577 | 1.777 | 1.949 | 2.102 |
| United Kingdom[3] | 1.000 | 1.128 | 1.216 | 1.280 | 1.336 | 1.376 |
| Ireland[3] | 1.000 | 1.240 | 1.406 | 1.542 | 1.646 | 1.740 |
| France[2] | 1.000 | 1.232 | 1.391 | 1.517 | 1.622 | 1.713 |
| Germany[3] | 1.000 | 1.204 | 1.345 | 1.452 | 1.548 | 1.619 |
| Belgium[2] | 1.000 | 1.237 | 1.401 | 1.538 | 1.639 | 1.733 |
| Denmark[2] | 1.000 | 1.400 | 1.703 | 1.958 | 2.182 | 2.384 |
| Netherlands[2] | 1.000 | 1.138 | 1.227 | 1.294 | 1.349 | 1.396 |
| OECD equivalence scale[4] | 1.000 | 1.700 | 2.200 | 2.700 | 3.200 | 3.700 |
| Modified OECD scale[4] | 1.000 | 1.500 | 1.800 | 2.100 | 2.400 | 2.700 |

[1]Average for a number of European countries based on Van Praag, Hagenaars and Van Weeren (1981).
[2]Scale based on results from the same data.
[3]Based on Van Praag, Hagenaars and Van Weeren (1981).
[4]Figures for 2 persons: 2 persons above 14; 3 or more persons: 2 persons above 14, remainder younger than 14.