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## **Measurement of income distribution in supranational entities: The case of the European Union**

by Andrea Brandolini

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# MEASUREMENT OF INCOME DISTRIBUTION IN SUPRANATIONAL ENTITIES: THE CASE OF THE EUROPEAN UNION

by Andrea Brandolini\*

## Abstract

Greater social cohesion is an explicit goal of the European Union. Progress is monitored considering the performance in each member country on the basis of national indicators; EU-wide estimates of inequality and poverty play no role. Yet this is a basic information to evaluate the progress of the Union toward greater social cohesion. This paper examines the methodological requirements of this evaluative exercise, and provides the first estimates of inequality and poverty in the enlarged European Union as if it was a single country.

**JEL Classification:** D31, C80.

**Keywords:** income distribution, inequality, poverty, Euro area, European Union.

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## 1. Introduction<sup>1</sup>

The rapidly growing literature on world income inequality has drawn attention to the measurement of income distribution in supranational entities. This exercise raises some new problems, like the conversion to a common currency standard, but mainly forces us to see in a different light questions that are encountered in studying income distribution at the national level. Developing these issues is one aim of this paper. In doing so, however, I shall not take the entire world, but the European Union (EU) as my case study. The first reason is that the abundance and quality of available data and statistics for the EU allow me to examine in depth the questions involved in deriving the distribution of income in a supranational entity. The second reason is that EU member countries are engaged in a process of economic and political unification which has no parallel at the global level. This gives EU-wide indices of poverty and inequality a significance that goes well beyond intellectual curiosity.

Economic objectives – the single market and the monetary union – have long obscured the social dimension of the European unification process. As observed by Sen (1996: 33), it is surprising how these instrumental objectives overshadowed the underlying ‘... bigger objectives that involve social commitment to the well-being and basic freedoms of the involved population’. The Lisbon European Council of 2000 marked a change of perspective in recognising the strategic goal of ‘greater social cohesion’ and committing to taking steps ‘to make a decisive impact on the eradication of poverty’ (Council of the European Union 2000). The ‘Lisbon strategy’ led to the adoption in 2001 of the Laeken social indicators, which in a sense parallel the Maastricht criteria of economic convergence (Atkinson *et al.* 2002; Giannusso and Tangorra 2002; Daly 2006). These indicators, which include income

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poverty and inequality indices, are deemed to monitor and compare the social performance of each EU member state. The picture of the Union emerges only by aggregation of the national evidence, and no attempt is made to *directly* estimate EU-wide values: these are typically computed as ‘population-weighted averages of available national values’ (European Commission 2006: 77). Yet the level and evolution of inequality and poverty measured for the EU as if it was a single country can be regarded as basic information in evaluating the progress of the Union toward greater social cohesion. This very same point was made by Atkinson, in a different context, as early as 1989 (but published in 1995):

‘If the Community continues to assess poverty purely in national terms, taking 50 per cent of national average income, then the impact of growth on poverty in the Community will depend solely on what happens within each country. However, a central question concerns the possibility of moving to a Community-wide poverty line, with the same standard applied in all countries. In that case, the effect of growth on the extent of low income is affected by the relative growth rates of different member countries’ (Atkinson 1995: 71).

Statistical and conceptual difficulties may have so far prevented Eurostat and the European Commission from producing official Community-wide estimates (except for European Commission 2000: 20). Somewhat surprisingly, however, academic research has also lagged behind. Atkinson (1996), Beblo and Knaus (2001) and Boix (2004) are the only attempts of which I am aware to estimate income inequality in the EU, while Atkinson (1995, 1998), de Vos and Zaidi (1998), Förster (2005) and Fahey, Whelan, and Maître (2005) examine the implications of adopting area-wide poverty lines. This state of affairs contrasts with the large number of studies and the passionate debate on world income inequality – the measurement of which is certainly no less arduous than that for the EU. Thus, the second aim of this paper is to provide new estimates of income distribution in the enlarged EU as a whole.

The methodological issues involved in deriving the personal distribution of income in a supranational entity are examined in Section 2. After a description of data sources, Section 3 presents the estimates of inequality and poverty in the EU around 2000 and compares them with the corresponding values for the USA. Section 4 concludes.

## 2. Conceptual problems in measurement

In this paper, I am interested in the distribution of real income, which I take as an indicator of (material) standard of living. Nominal incomes are adjusted to take into account that households differ in their composition, needs vary with age, and cohabitation generates economies of scale in consumption: the income necessary for a single person to achieve a certain living standard is quite different from the income necessary for a couple with two young children. Moreover, households face different price vectors which influence their actual command over resources: for instance, housing tends to be far more expensive in large cities than in rural areas. Thus, if  $x_{ijk}$  denotes income of type  $i$  (e.g. property income) received by household  $j$  in country  $k$ , real income is defined as

$$y_{jk} \equiv \frac{\sum_i c_{ijk} x_{ijk}}{e_k p_{jk} m_k(h_{jk})}, \quad (1)$$

where  $m$  is some function, possibly country-specific, of household characteristics  $h_{jk}$  relative to the reference household (for which  $m_k = 1$ );  $p_{jk}$  is the index of prices faced by the household;  $e_k$  is the conversion rate from country  $k$ 's currency to the common unit of account; and the  $c_{ijk}$ 's are correction factors which adjust survey data to benchmarks derived from national accounts to allow for underreporting or simply the misalignment between micro and macro sources.

Definition (1) helps to put the analysis of income distribution in a supranational entity in the more general context of research on income distribution. In studies of national distributions, where the conversion rate plays no role, the  $p_{jk}$ 's and  $c_{ijk}$ 's are generally ignored and real income is simply defined as  $\sum_i x_{ijk} / m_k(h_{jk})$ . However, this is not always the case: differences in the cost of living are receiving growing attention, as discussed below, and there is a tradition of studies which adjust survey data to national accounts. For instance, van Ginneken and Park (1984) produced adjusted income distributions in nine countries by applying proportional correction factors to labour and transfer incomes while attributing the

entire difference between national accounts and aggregated survey data to the top fifth of the unadjusted income distribution. In the literature on the world income distribution,<sup>2</sup> comparisons are usually made in terms of per capita income, adjusted to gross national income and expressed in some common international standard: real income is defined as  $c_k \sum_i x_{ijk} / e_k s_{jk}$ , where  $s_{jk}$  is the household size and  $c_k$  is a correction factor equal across all households and income types in country  $k$ .

Four conceptual questions in the estimation of income distribution in a supranational entity are examined in the rest of this section. The background is provided by the research on world income inequality, but the discussion is extended to embody aspects relevant to the EU context. The important issue of the comparability of the data used to estimate the world income distribution is not addressed here; on this, see Atkinson and Brandolini (2001).

### *2.1 Conversion to a common currency standard*

Conversion of incomes measured in different units of account to a common standard could be straightforwardly achieved by using market exchange rates. However, these rates are influenced by many factors, such as the flows of international trade or speculative capital movements, and need not reflect the price structures that prevail in the various countries. In poor countries labour-intensive non-tradable services are typically cheaper than in richer countries: since market exchange rates are unlikely to account for these price differences, their use would lead to understatement of real incomes in poor countries. Purchasing Power Parities (PPPs) have been developed to obviate these problems. They are the relative values, in national currencies, of a fixed bundle of goods and services, and provide the conversion rates from national currencies to an artificial common currency, such as Purchasing Power Standard (PPS) in Eurostat statistics and international dollars in the Penn World Table. Note

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<sup>2</sup> To my knowledge, Whalley (1979) was the first to estimate world income inequality. A non-exhaustive list of subsequent contributions include Berry, Bourguignon, and Morrisson (1983*a, b*), Grosh and Nafziger (1986), Chotikapanich, Rao, and Valenzuela (1997), Schultz (1998), Bhalla (2002), Bourguignon and Morrisson (2002), Milanovic (2002), Dowrick and Akmal (2005) and Sala-i-Martin (2006). Svedberg (2004) and Milanovic (2006) are recent surveys of this literature.



that PPPs embody both the conversion to a common standard,  $e_k$ , and the adjustment for price level differences,  $p_{jk}$ , where  $p_{jk}$  is supposed to be same for all households within a country. Although widely followed, this approach is not exempt from problems.

First, there is a multiplicity of sources. The GDP estimates by Maddison (2001) and the Penn World Table constructed by Summers and Heston (1991) are two sources frequently used in the literature on world income distribution, but PPPs are routinely computed by international organisations such as the World Bank or the Organisation for Economic Co-operation and Development. Here, I use the annual estimates by Eurostat that cover all European countries and the USA (Stapel, Pasanen, and Reinecke 2004).

Second, methods to estimate PPPs differ. The methodology applied by Maddison and the Penn World Table multiplies quantities of goods (or services) by average international prices which are obtained, for each good, by weighting the national price with the country's share in the total world consumption. This implies that the structure of international prices tends to approximate that prevailing in relatively richer, and more populous, nations, as prices in countries with a bigger share of world consumption get higher weights. As stressed by Dowrick and Akmal (2005), the use of average international prices leads to a bias that is opposite in sign to the 'traded sector bias' implicit in market exchange rates: the real income of people living in poor countries is bound to be overstated if the goods and services consumed there in greater quantity because they are cheaper are valued at the prices prevailing in richer countries. Dowrick and Akmal (2005) show that adopting a PPP index which corrects for this bias affects the conclusion on the trend in global income inequality.

Third, PPP indices are estimated for various national accounts aggregates. In the case of European countries, Eurostat makes available not only the index for gross domestic product (GDP) but also specific indices for a number of expenditure components of GDP. Results may vary considerably. Were nominal incomes deflated by the PPP index for household final consumption expenditure (HFCE) rather than the PPP index for GDP, in 2000 real incomes would be 8 to 12 per cent lower in Finland, Latvia, Lithuania, Malta and Poland, but 6 and 11 per cent higher in Germany and Luxembourg, respectively. As these differences are positively correlated with the level of per capita gross national income (GNI) in PPS, the use of the PPP index for GDP tends to narrow international differences in real

incomes relative to the PPP index for HFCE. In order to derive the EU distribution of real incomes, it might be preferable to employ the latter because it measures purchasing power in terms of consumption goods and services, and because GDP covers items, such as in-kind transfers for education and health care, which are generally not included in the household disposable income measured in surveys (Smeeding and Rainwater 2004). On the other hand, Eurostat currently applies the index for GDP to derive all national accounts variables expressed in PPS (see methodological notes in Eurostat 2006). For this reason, in the following I present figures obtained with both types of PPP index.

## *2.2 Regional differences in price levels*

One objection that can be raised against using PPP indices is that it is mistaken to apply the same conversion factor for the poor and the rich, when we know that expenditure composition varies across the income distribution. This question, however, does not arise only in relation to PPPs. It is part of the more general issue of whether we should use group-specific price indices to transform nominal incomes into real incomes. A related question is, for example, the extent to which inflation affects differently people at diverse positions in the income distribution (see Atkinson 1983: 91–4). It is beyond the scope of this paper to investigate these issues, but one question needs to be briefly addressed here: Is it not inconsistent to correct only for cost-of-living differences across nations, ignoring differences across geographical areas within the same nation? Such a differential treatment could be justified if the latter were less important than the former. However, even interpreting these differences in the broadest sense as reflecting the direct provision of public services or the structure of product markets, it is not obvious that this is the case. The fact is that we have little information about territorial variations in the price level. Hence, the choice of correcting only for cross-national differences is basically made out of ignorance.

This problem is recognized by statistical offices, which are especially concerned with the cost of housing. In the USA, the National Research Council of the National Academy of Sciences Panel on Poverty and Family Assistance recommended that poverty thresholds be adjusted for differences in the cost of housing across geographical areas of the country (Citro and Michael 1995). This recommendation was applied by Short *et al.* (1999) and Short

(2001) as well as Jolliffe (2006). Declich and Polin (2005) studied absolute poverty in Italy by estimating budget standards at the regional level. Insee (1997) and Mogstad, Langørgen, and Aaberge (2005) used, instead, an indirect approach and accounted for regional price-level differences in France and Norway, respectively, by setting region-specific relative poverty lines. The shortcoming of this procedure, however, is that it mixes up the differences in the cost of living with those in the level of economic development. To the extent that price levels only partially compensate for geographical differentials in development, using region-specific relative poverty lines amounts to set a lower real standard for poorer regions.

Accounting for geographical differences in price levels, across regions and between urban and rural areas, is important in the evaluation of the material standard of living, but is at present prevented by the lack of data. In this paper I provide both PPP-adjusted estimates to correct for cross-national differences in the cost of living, and unadjusted figures. Note that using unadjusted figures parallels the standard practice in national reports of ignoring territorial differences in price levels, and is a perfectly sensible exercise in analyses of income distribution in the euro area (and, to a large extent, in the entire EU, given the relative stability of the exchange rates vis-à-vis the euro).

### *2.3 Sample surveys vs. national accounts*

In the first edition of *The Economics of Inequality*, Atkinson distinguished between the ‘international’ distribution of income, ‘the differences between countries in terms of average *per capita* incomes’, and the ‘world’ distribution of income, ‘the distribution of income among all people of the world’ (1975: 237). To show that the former is less concentrated than the latter, he graphed the 40th and 95th percentiles of national income distributions together with the average per capita income for the USA, the UK, Brazil and India (1975: 246, Figure 12–2). This graph anticipated the practice of merging survey data on income distribution with mean incomes from national accounts, which is now standard in the literature on world income inequality.

This method is a natural extension of the analysis of international differences in mean incomes: it accounts for within-country distributions, without altering the country ranking

provided by the national accounts. On the other hand, it tends to obscure the fact that national accounts are intrinsically different from survey data. As recently put by Deaton:

‘... the differences in coverage and definition between [National Accounts] and surveys mean that, even if everything were perfectly measured, it would be incorrect to apply inequality or distributional measures which are defined from surveys, which measure one thing, to means that are derived from the national accounts, which measure another’ (2005: 17).

The same view is taken in research conducted at the World Bank. The estimates of world poverty by Chen and Ravallion (2001) and world inequality by Milanovic (2002) do not use national accounts means and are only based on survey data (except for PPP indices).

What are the implications for the estimation of the EU-wide income distribution? Several income concepts in national accounts can provide a benchmark for survey data. Table 1 reports three aggregates: gross national income (GNI), household gross disposable income (HGDI) and household net disposable income (HNDI). (These aggregates, expressed in PPS and per capita terms, refer to the year for which survey data are available.) The GNI concept, which is the most common in the literature on the world income distribution, sums the incomes received by all residents (net of incomes paid out), including the government, financial, and non-financial sectors. Excluding the incomes of these sectors reduces considerably the reference aggregate income: on average, in the countries for which data are reported in Table 1, HGDI is 64 per cent of GNI, a figure that falls to 61 per cent after deducting the depreciation on the capital stock owned by households (HNDI). By focusing on the household sector, HGDI and HNDI are somewhat closer to the incomes recorded in household surveys. Yet, except in Denmark, survey means (TNHI) fall considerably short of them. As well known from studies reconciling micro and macro sources (e.g. Atkinson and Micklewright 1983, for the UK; Brandolini 1999, for Italy), only part of these discrepancies can be attributed to underreporting and sampling errors in surveys; some part is due to the many conceptual differences.<sup>3</sup>

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<sup>3</sup> For instance, since separate accounts for non-profit institutions serving households are only available in some countries, HGDI and HNDI include the disposable income of these institutions; they also include the disposable income of persons living permanently in institutions (military bases, hostels, nursing homes for the

What matters here is the change in international differences in mean incomes. The per capita income of Estonia, for instance, falls from 35 per cent of the UK value using GNI to 26 per cent using TNHI. This is a large variation that could influence estimates of the EU-wide distribution. As shown in Figure 1, the ratio of survey means to national accounts aggregates is positively correlated with the level of per capita GNI expressed in PPS. (This evidence runs counter that for world countries presented by Milanovic 2002: 64, Figure 1.) This implies that the alignment of household-level data to aggregate statistics is likely to reduce measured income inequality.

To sum up, Deaton and the World Bank researchers correctly warn against unwarily merging national accounts and survey data. On the other hand, the twofold need to correct for deficiencies in household-level data and to re-establish the cross-country income ratios known from national accounts – whose rationale can be found in the role played by regional GDP per capita in the allocation of EU structural funds – may justify a controlled use of the adjustment to aggregate statistics. These considerations bring me to examine both unadjusted and adjusted incomes (either to GNI or to HNDI).

#### *2.4 Using a common income equivalization procedure?*

As mentioned above, the literature on world income inequality tends to focus on per capita incomes, at least in theory. (In practice, several studies mix up statistics computed on per capita, equivalent and household bases, drawn from international compilations of income distribution statistics.) This choice amounts to assume away economies of scale in consumption, and is at variance with the practice followed in developed countries. Atkinson, Rainwater and Smeeding (1995: 18–21) describe a wide range of equivalence scales in use in OECD countries, which explains why the function  $m$  in (1) is indexed by  $k$ . In the UK, for example, estimates of households below average income are derived using the McClements equivalence scale, although this scale is soon to be replaced with the modified OECD scale

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elderly, etc.), which is generally excluded from sample surveys. Moreover, HGDI and HNDI incorporate, as GNI, the imputed rents on owner-occupied houses, whose amount is significant in many EU countries.

recommended by Eurostat (DWP 2006: 207). This scale assigns value 1 to the first adult, 0.5 to any other person aged 14 or older, and 0.3 to each child younger than 14.

The Eurostat recommendation enhances cross-country comparability, as it is well known that income distribution figures are very sensitive to the choice of the equivalence scale (e.g. Buhmann *et al.* 1988). On the other hand, the modified OECD equivalence scale may be too rigid. For instance, the assumption that economies of scales in consumption are the same everywhere has been questioned by researchers from Eastern Europe. According to Szulc, the original OECD scale (which assigns weights 0.7 to any adult member beyond the first and 0.5 to children) is more appropriate than the modified OECD scale for Poland and ‘less developed countries’ since they have ‘relatively high expenditures on food (characterized by low economy of scale) and relatively low expenditures on housing (characterized by high economy of scale)’ (2006: 427). Éltető and Havasi use the very same argument to reject the use of the modified OECD scale for Hungary: ‘... *no global, generally applicable equivalence scale can be constructed because an appropriate scale is largely determined by the country’s special circumstances*, e.g. its level of development or whether expenditures connected to individual needs such as food, clothing etc. represent a dominant or a small portion in the total expenditure of households’ (2002: 137). In the past, the standard practice of Eastern European statistical agencies was to calculate income per capita (Atkinson and Micklewright 1992: 69–71).

The adoption of a single equalization procedure across EU countries is required by international comparability, but it does not imply the strict formulation of the modified OECD scale. The scale could be made dependent on the income level of the household, or of the country or region where the household lives. In my empirical analysis, I present results based on a per capita adjustment, the original and the modified OECD scales, and a ‘mixed OECD’ scale combining the original OECD scale for Eastern European countries with the modified OECD scale for the EU15. The issue is worth further investigation, but it must be borne in mind that assuming lower economies of scale in less developed countries would associate a lower real income to a given nominal income, amplifying the distance between rich and poor countries within the EU.

### 3. Income distribution in the enlarged EU

#### 3.1 Data sources

Data for the fifteen countries which were members of the EU in 2000 are drawn from the European Community Household Panel (ECHP), the official source used by the European Commission to compare income poverty and inequality in the 1990s. The ECHP was a fully harmonized annual longitudinal survey conducted by national agencies from 1994 to 2001 under Eurostat co-ordination in order to collect detailed information on income, standard of living, demographic characteristics and labour market behaviour.<sup>4</sup> Here, I use information on incomes earned in 2000 drawn from the last wave. Total household disposable income is obtained by aggregation of all income sources net of direct taxes and social contributions (variable HI100). All observations are weighted by cross-sectional weights (variable HG004).

Data for six of the ten countries that joined the EU in 2004 (Czech Republic, Estonia, Hungary, Poland, Slovak Republic, Slovenia) and for the USA are drawn from the Luxembourg Income Study (LIS). The LIS project began in 1983 with the objective of creating a database containing social and economic data collected in household surveys in different countries (Smeeding 2004). Unlike the ECHP, variables in the LIS database are derived from independent surveys which are harmonized ex post. The LIS total household disposable income is also obtained by aggregation (variable DPI). As incomes for Hungary, Poland and Slovenia refer to 1999, and for the Czech and Slovak Republics to 1996, I raise the LIS values by the cumulative increase of per capita GNI (at current prices) between the available year and 2000; no such adjustment is necessary for Estonia.

Distribution is measured among individuals, attributing to each person the equivalent or per capita income of the household to which he or she belongs. For each country, sample

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<sup>4</sup> All EU countries participated for the whole period, except Austria and Finland, which joined in 1995 and 1996 respectively, and Sweden, which later added data from the Swedish Survey of Living Condition. In 1996 the ECHP was discontinued in Germany, Luxembourg and the UK and replaced with existing national panel surveys.

weights are rescaled so that they add up to the total population. This amounts to an assumption that income distribution is the same among persons living permanently in institutions (nursing homes, residential schools, prisons, military bases, etc.) as it is among those living in households. Nationality is defined on the basis of residence: Estonians living in France are regarded as part of the French population. (As for other private transfers, there could be a problem of double-counting with remittances, if they are not subtracted from the sender's income.) In computing the OECD equivalence scales, it is assumed that all members are adult whenever information on the age of household members is missing. Unfortunately, this is the case for all Slovakian data; since the equivalence coefficient is higher for adults than for children, this hypothesis means that equivalent incomes are understated for all Slovakian households with children younger than 14. Non-positive incomes are dropped.

The estimates discussed below for the euro area and the EU15 are based on the ECHP data, while those for the EU25 are obtained after merging the ECHP data with the LIS data. The label EU25 is used throughout the paper, although Cyprus, Latvia, Lithuania and Malta are not included because of lack of data; the twenty one countries for which data are available account for 98.5 per cent of the total EU population in 2000. Results must be taken with some caution, especially for the EU25. Comparability is supposedly higher for the ECHP data, which are from surveys harmonized *ex ante* (at least in eleven countries), than for the LIS data, which derive from an *ex post* standardisation. Moreover, the LIS and ECHP income definitions are broadly consistent but no adjustment is made for the remaining discrepancies. Finally, the representativeness of the last ECHP wave used here may have been reduced by the significant sample attrition recorded in most countries (Lehmann and Wirtz 2003: 2–3).

### 3.2 *Inequality*

Figure 2 summarizes the distribution of real incomes in 2000 in the twenty one EU member countries for which household-level data are available. The graph shows for each country the median value (the thick horizontal mark), the distance between the 20th and the 80th percentiles (the thick vertical bar), and the 5th and 95th percentiles (the two extremes of the thin vertical bar). All values are unadjusted survey statistics in thousands of PPS (GDP).



The country ranking by median real income follows a known pattern, with Eastern European nations preceding Southern European countries, and then the remaining EU countries rather close to each other except for Luxembourg which is clearly leading. Income differences in the Union are sizeable, both across and within countries. The Estonian median is only 18 per cent of the Luxembourg median, and this figure falls to 14 per cent if the comparison is made at the 5th percentile. For 80 per cent of Eastern Europeans incomes are below or at most comparable to the incomes of the poorest 20 per cent of Europeans living in Central and Nordic countries. The variable lengths of the vertical bars reveal some noticeable differences in within-country income dispersion, such as that between Denmark and the UK. It should be noted that these bars show *absolute* and not *relative* differences. If percentiles were expressed as percentages of national medians, as customary in cross-national inequality comparisons, income differences in Eastern European countries would not look so small compared to those in the EU15. Indeed, Estonia would exhibit the second largest value of relative inequality after Portugal.

These cross-national income differences impinge on measured inequality in the EU as a whole. Table 2 reports several statistics on the distribution of real incomes in the euro area, the EU as of 2000 (EU15) and the enlarged EU (EU25). (The corresponding figures for the USA are discussed later.) Eight values are reported for each statistic: seven of them differ either for the unit of account (euros vs. PPS), or for the type of adjustment to national accounts (none, to GNI, and to HNDI); the last is the population-weighted average of national values, which corresponds to the concept used in Eurostat publications. Table 3 shows the impact of different equivalence scales on the same statistics.

Four results can be noted with regards to the various methodological hypotheses.

- Measured inequality is higher when incomes are expressed in euros than in either of the two PPS measures. The difference is modest for the euro area and the EU15, but is significant for the EU25. Inequality is slightly lower with the PPP index for GDP than with the index for HFCE.
- Adjusting to national accounts decreases measured inequality, but whether GNI or HNDI is chosen makes little difference.

- The highest inequality is found for per capita incomes; inequality is lower with the modified OECD scale than with the original OECD scale. In the EU25 incomes are more concentrated when deflated by the mixed OECD scale than by any of the other two OECD scales, essentially because people at the bottom of the distribution are poorer (see the values of P10 and P20).
- The degree of inequality measured for the EU as a whole is always higher than the population-weighted average of national values. The difference is particularly large for the enlarged EU. This is a warning against using a population-weighted average as a proxy whenever real income differences are large. More generally, this exposes the weak theoretical justification of such a measure: it is unclear what the average of within-country relative inequality indices tells us about the distribution of income in the EU.

Focusing on unadjusted real incomes in PPS, in 2000 the degree of inequality was very similar in the euro area and in the EU15. The Gini index was just below 30 per cent, about the same value found in Italy, and midway between the minimum 22 per cent of Denmark and the maximum 37 per cent of Portugal. The richest 10 per cent earned 85 per cent or more of the median person, while the real income of the poorest 10 per cent did not reach half the median, a situation fairly close to that of the UK. The enlargement to Eastern Europe has perceptibly increased the EU-wide concentration of incomes, as measured in 2000. The Gini index has grown by over three percentage points to 33 per cent, the 10th percentile has fallen below 40 per cent of the median, and the 90th percentile has risen to almost twice the median.

### *3.3 Poverty*

When the EU is analysed as a single country, the replacement of national poverty lines with a single Community-wide line is the main departure from Eurostat methodology for the measurement of poverty. As observed by Atkinson, if the poverty line is regarded as the minimum level of resources that a European citizen should have in order to fully participate in the life of society, which of these lines is chosen is a 'political judgement': the EU-wide line would represent 'a significant move towards viewing the European Union as a social entity'

(1998: 29).<sup>5</sup> Atkinson (1995, 1998) suggests that we may want to take an intermediate position and proposes a weighted geometric average of national and EU poverty lines. Following his lead, I consider the family of poverty lines for country  $k$

$$z_{\theta} \equiv 0.6(\bar{y}_{EU})^{\theta}(\bar{y}_k)^{1-\theta}, \quad (2)$$

where  $\bar{y}_{EU}$  and  $\bar{y}_k$  are the median real incomes for the EU and country  $k$ , respectively. The parameter  $\theta$  ranges from 0 to 1:  $\theta = 0$  corresponds to Eurostat methodology of setting lines at the national level, while  $\theta = 1$  implies a move towards treating the EU as a single country.

Tables 4 and 5 report the head-count poverty ratios and the absolute number of people in poverty for eleven values of  $\theta$  and various real income definitions. Looking at  $\theta = 0$  first, about 15 per cent of Europeans were in poverty in 2000, regardless of the boundaries of the Union. This figure corresponded to 47 million persons in the euro area, 59 million in the EU15, and 68 million in the EU25. As the computation is fully relative, the income adjustment and the account unit do not evidently make any difference. Results are quite different when  $\theta = 1$ : adopting an EU-wide line raises the incidence of poverty. It is more so when incomes are not adjusted to national accounts, and when they are expressed in euros at the market conversion rates rather than in PPS (either HFCE or GDP). As shown by Figure 3, the head-count rates change monotonically, as  $\theta$  varies from 0 to 1. Tables 6 and 7 show that poverty figures are very similar using either of the OECD equivalence scales, but are uniformly higher when it is assumed that there are no economies of scale in consumption. In the EU25, the closer the threshold to the EU-wide line, the more the estimates based on the mixed OECD scale exceed those based on the other OECD scales.

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<sup>5</sup> The adoption of an EU-wide standard does not require that people feel member of the European society more than they do of their national or regional community. Fahey, Whelan, and Maître (2005) rest their case for adding an EU-wide measure of poverty to the existing national measures on the observation that the reference frame used by people to determine their sense of deprivation includes the European context as well as the national context. Using a wide range of objective and subjective indicators of the quality of life, they show that even people in upper middle classes in the poorest countries are and feel worse off than low or middle income groups in the wealthy EU countries. On the related issue of the choice between local and national poverty standards, see also Jesuit, Rainwater, and Smeeding (2003).

Considering unadjusted incomes in PPS (GDP), poverty rates increase from 15.4 to 17.5 per cent in the euro area and from 15.5 to 17.3 in the EU15, as the area-wide line replaces the national lines. In the enlarged European Union, the incidence of poverty goes up by a half, from 15.2 to 23.0 per cent, and the absolute number of poor people increases from 68 to 103 millions. An even more dramatic change takes place in the geography of poverty. As the line changes from national to area-wide, half or more of Eastern European population ‘moves’ into poverty, with a peak of 79 per cent in the Slovak Republic; a significant fraction of the population is also re-classified as poor in Southern Europe; the opposite occurs in the rest of EU countries, with poverty virtually disappearing in Luxembourg (Figure 4). These numbers are roughly halved when an intermediate stance is taken ( $\theta = 0.5$ ). Figure 5 illustrates the ‘easternization’ of poverty as we move away from the national lines toward the Community-wide line: whereas the share of poor living in Eastern Europe rises from 13.6 to 49.5 per cent, all other shares fall, slightly in Southern Europe (from 33.8 to 30.2), more sharply in Continental Europe (from 33.4 to 12.8), in the Nordic countries (from 3.1 to 1.2), and in the UK and Ireland (from 16.1 to 6.3).

### *3.4 Are inequality and poverty higher in the EU25 than in the USA?*

Available estimates suggest that income distribution is less unequal in the EU than in the USA. This is the case of the EU15 in the 1980s, according to Atkinson’s (1996: 25–6) LIS-based ‘prototype’ estimates, and of the euro area in 1995, as assessed by Beblo and Knaus (2001: 308) on the basis of the ECHP data plus the LIS data for Finland and the USA. The calculations by Boix (2004: 7, Table 3) on data assembled by Milanovic for his 2002 article indicate that per capita income inequality in the USA is not only higher than in the EU15 but also the EU25: the Gini indices were 39.4 per cent in the USA, 34.2 per cent in the EU15, and 38.0 per cent in the EU25 in 1993.

My own calculations confirm this conclusion, in so far as the comparison is made in PPP terms. Earlier exercises compared PPP-adjusted incomes for the EU with dollar incomes for the USA, thus ignoring the variation in price levels within the USA. However, this variation is not negligible: for instance, according to the cost-of-living indices estimated by Berry, Fording and Hanson (2000, as revised in 2004), in 2000 one dollar was worth a third

more in Mississippi than in Massachusetts. To control for this source of inconsistency, I supplement the customary statistics in US dollars with novel estimates adjusting for price level differences across the American states with the indices calculated by Berry, Fording and Hanson, in the absence of official state-level PPP series.<sup>6</sup> Note, however, that these indices are estimated by means of econometric techniques and are only partially comparable to those calculated by Eurostat. They are used here as a first approximation. Unlike in the EU, the adjustment for the cross-state variation in price levels makes virtually no difference for measured US inequality and poverty (see bottom two lines in Tables 2, 4 and 5).

Income distribution in the USA is consistently wider than in the EU15 and the euro area; it is wider than in the EU25 provided that incomes are adjusted for differences in purchasing power. When survey unadjusted incomes in PPS are considered, the Gini index is 33 per cent in the EU25 against 37 per cent in the USA. Differences appear to lie not at the bottom, as P10 and P20 look rather similar, but at the top: the 80th and 90th American percentiles are further away from the median than their European counterparts (Table 2). The difference is stark when inequality is measured by the Atkinson index with  $\epsilon = 2$ , a value which suggests substantial aversion to inequality. The Lorenz curves in Figure 6 confirm that incomes are more unequally distributed in the USA than in the EU25, and in the latter than in the euro area. The head-count poverty ratio is more or less the same on both sides of the Atlantic, around 23 per cent, when the area-wide lines are adopted; it is, however, 50 per cent higher in the USA than in the EU25 when poverty lines are country- or state-specific (Table 4). Note the tiny effect on US poverty rates of shifting the line from the national to the state level.

The ratio of the highest to the lowest median equivalent income in PPS is 1.5 in the USA vis-à-vis 5.6 in the EU25, or 4.3 if the outlier Luxembourg is excluded. Given the much more pronounced internal disparities, it is notable that income is less unequally distributed in

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<sup>6</sup> The original values are rescaled so that the weighted index for the entire country (with weights given by the state income shares in the LIS database) equals the PPP value provided by Eurostat for the US dollar in 2000. The country mean is used for Alaska, Hawaii and the District of Columbia, which are not included in Berry, Fording and Hanson's calculations.

the EU25 than in the USA. This result must be read against the background of a substantially higher mean real income in the USA (about 75 per cent).

#### 4. Conclusions

Drawing on the extensive research on world income inequality, in this paper I have analysed the conceptual issues in the measurement of income distribution in supranational entities. By taking the EU as a case study and the USA as a basis for comparison, I have shown how the conclusions are affected by the methodological choices on the currency conversion rate, the PPP index, the adjustment of survey data to national accounts, and the equivalence scale. In doing so, I have provided the first systematic picture of inequality and poverty in the enlarged EU as if it was a single country.

There are at least two reasons for investigating the distribution of income in the EU as a whole. The first is instrumental. Inequality and poverty are important measures of the heterogeneity of the EU society, and it could be argued that the higher this heterogeneity, the more fragile is the process of European integration. Thus, Boix has suggested that ‘unless the trade and security gains of any new enlargement wave are considerable, the European Union will be forced to delay any plans for tighter institutional integration’ (2004: 8). The evidence discussed in this paper does not seem worrisome on this account. The enlargement of May 2004 has indeed coincided with a noticeable rise of both inequality and poverty in the EU as a whole,<sup>7</sup> as could have been predicted on the basis of the different level of economic development of the new member countries. Yet the worsening does not look large on a comparative basis, nor by national historical records. As seen, when the comparison is properly made in PPP terms, the EU25 shows lower inequality and poverty than the USA,

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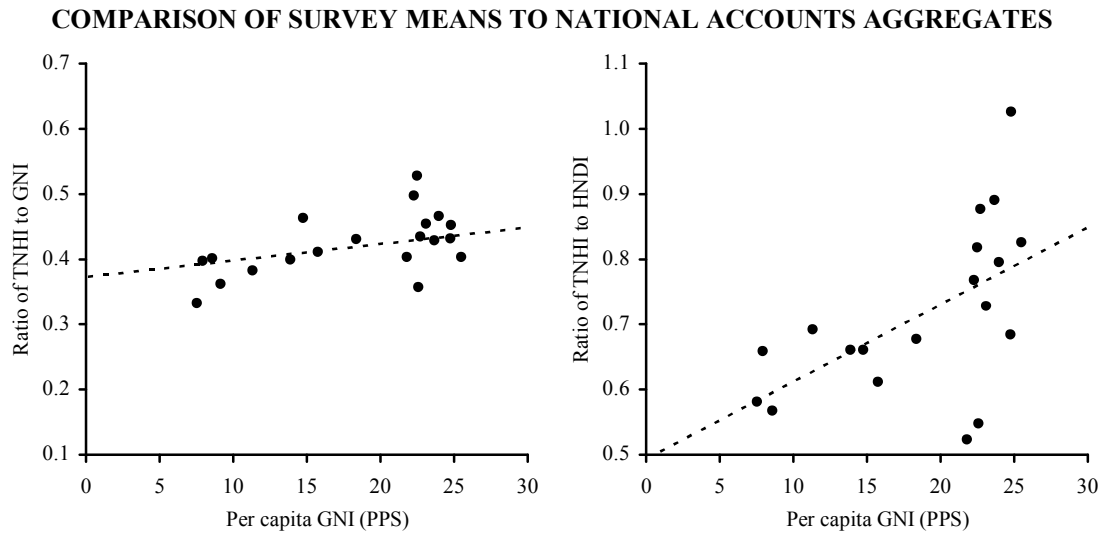
<sup>7</sup> The expansion of the EU population to include a considerable number of households with much lower real incomes leads to a fall of the EU median income, and hence of any poverty line which is based on it ( $\theta > 0$ ). Thus, in comparing the poverty rates for the EU15 and the EU25, it should be taken into account that the EU-wide poverty line decreases by 9 per cent as a result of the enlargement; as a fifth of the people that were classified as poor using the EU15 line are no longer poor according to the lower EU25 line, the head-count poverty rate in the EU15 countries falls from 17.3 to 13.7 per cent.

with poverty rates becoming similar only when area-wide lines are adopted. By taking the British historical experience as a reference, the increase by 3 percentage points of the Gini index associated with the EU enlargement compares to a rise in the UK by 7 points between 1985 and 1990, or a fall by 4 points between 2001–2 and 2004–5 (Jones 2006: 39, Table 27).

The second reason of interest is substantive. ‘Greater social cohesion’, the goal set out by the Lisbon summit, is an elusive concept. It is a basic tenet of this paper that the degree of inequality and the extent of poverty measured for the EU as a whole give it a clear and significant operational content, even if admittedly not the only one. The specific merit of considering the personal distribution of income in the EU as a whole is that it provides a unitary frame to jointly assess within-country relative incomes inequalities – the concern of the EU social policy frame – and cross-country income disparities – the concern of the EU regional policies (see, for a similar argument, Fahey, Whelan, and Maître 2005). A fall in inequality in all countries may not be progress towards greater social cohesion if incomes grow much more rapidly in the richest countries: it is easy to construct examples where the Gini index, or any other inequality measure, decreases in all countries but rises in the EU as a whole. The EU-wide perspective leads naturally to look at these contrasting trends together, and supplies fundamental information to integrate the analysis at the national level.

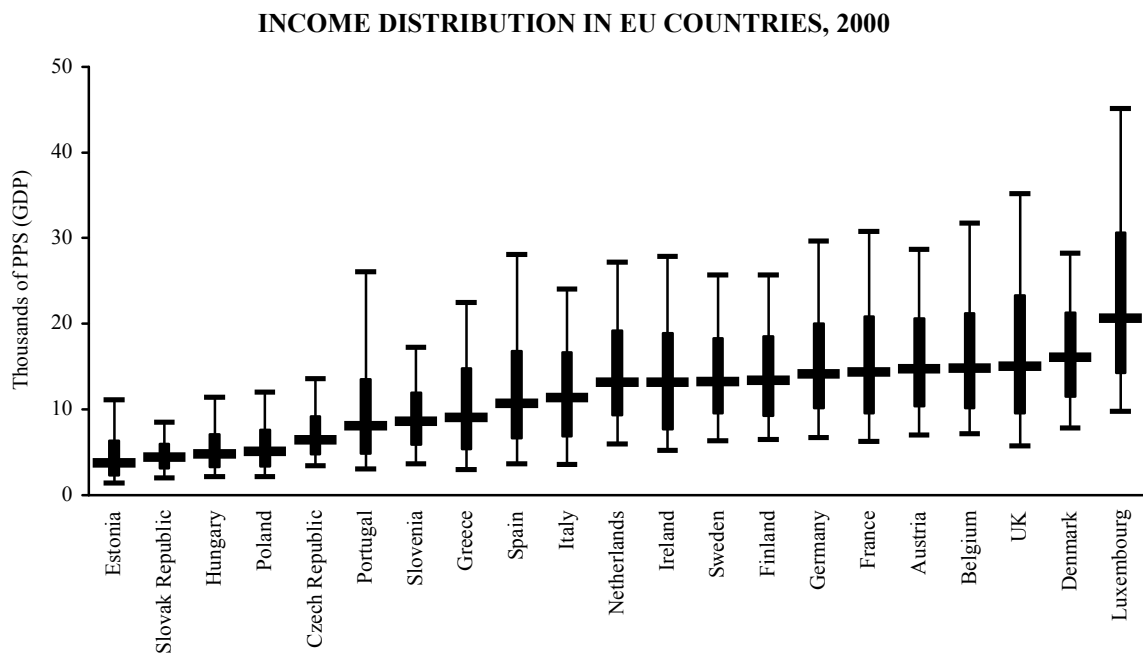
As pointed out by Atkinson, the EU-wide perspective can be seen as a significant move towards viewing the EU as a social entity. Does it require a strong sense of European identity? Not necessarily. The adoption of the EU-wide perspective would enrich our knowledge of the characteristics of a unification process that is going on anyway, and would help to bring to the fore what Sen called its underlying ‘bigger objectives’.

Figure 1



Source: author's estimation from data drawn from Eurostat, national accounts, ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). GNI: Gross national income (national accounts); HNDI: Household net disposable income (national accounts); TNHI: total net household income (ECHP-LIS).

Figure 2

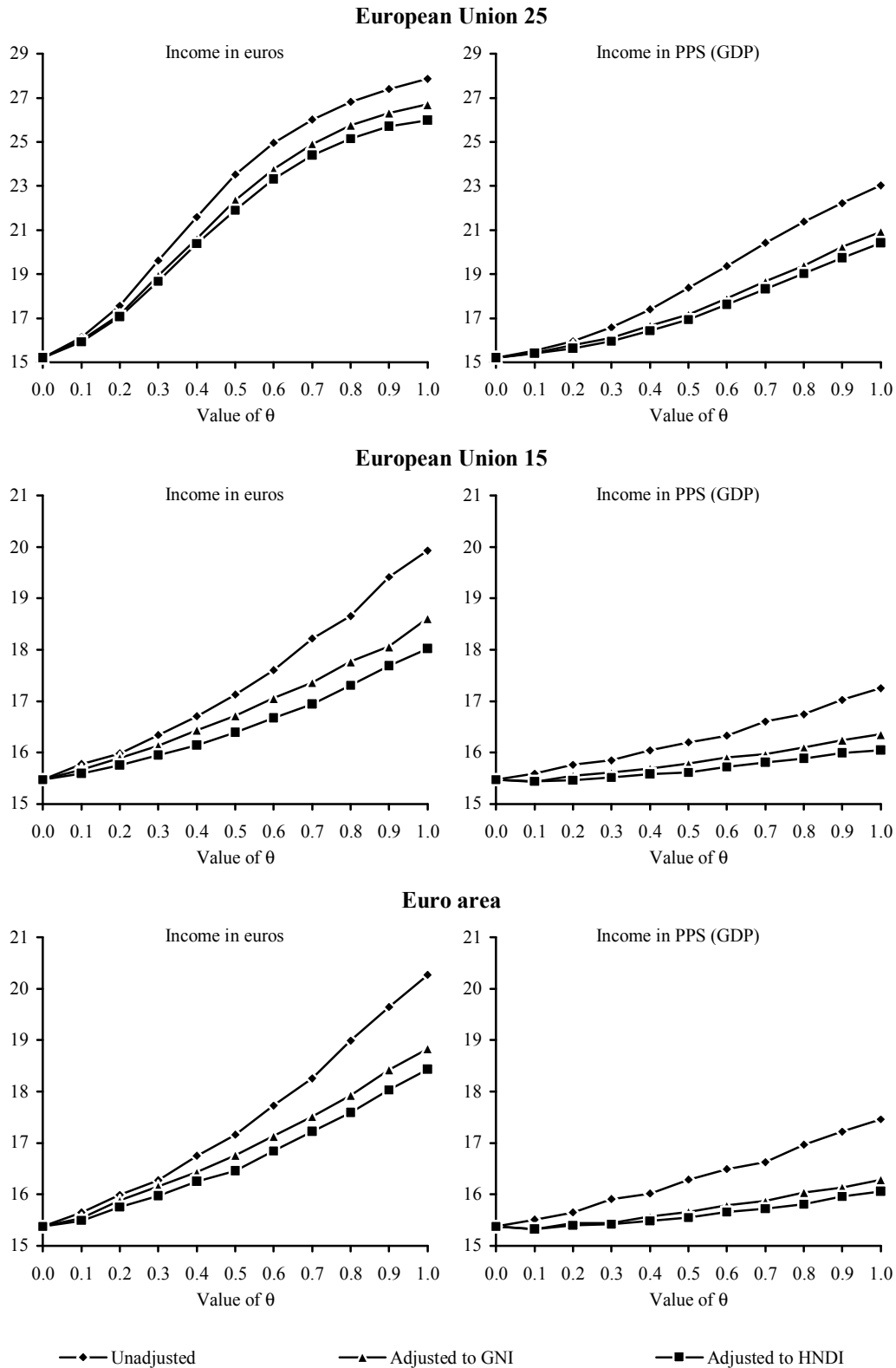


Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equivalized by the modified OECD equivalence scale, are not adjusted to national accounts and are in PPS (GDP). The graph shows for each country: the median value (the thick horizontal mark), the distance between the 20th and the 80th percentiles (the thick vertical bar), and the 5th and 95th percentiles (the two extremes of the thin vertical bar).



Figure 3

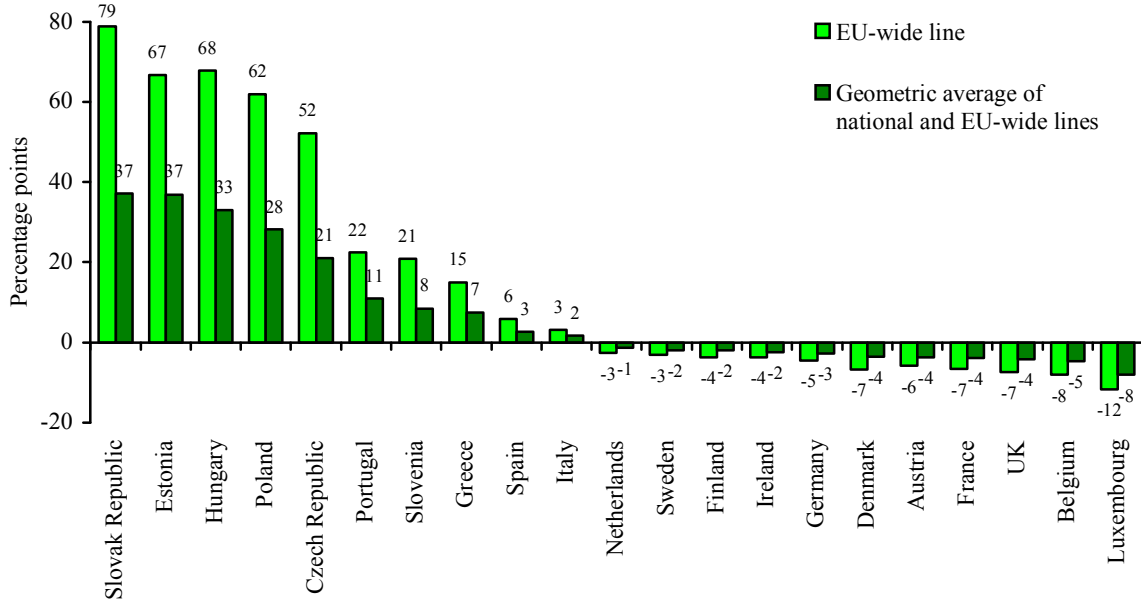
**HEAD-COUNT POVERTY RATIO BY ALTERNATIVE VALUES OF  $\Theta$ , 2000**  
(per cent)



Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equivalized by the modified OECD equivalence scale.  $\theta$  is the weight assigned to the EU-wide line and  $(1-\theta)$  to the national line.

Figure 4

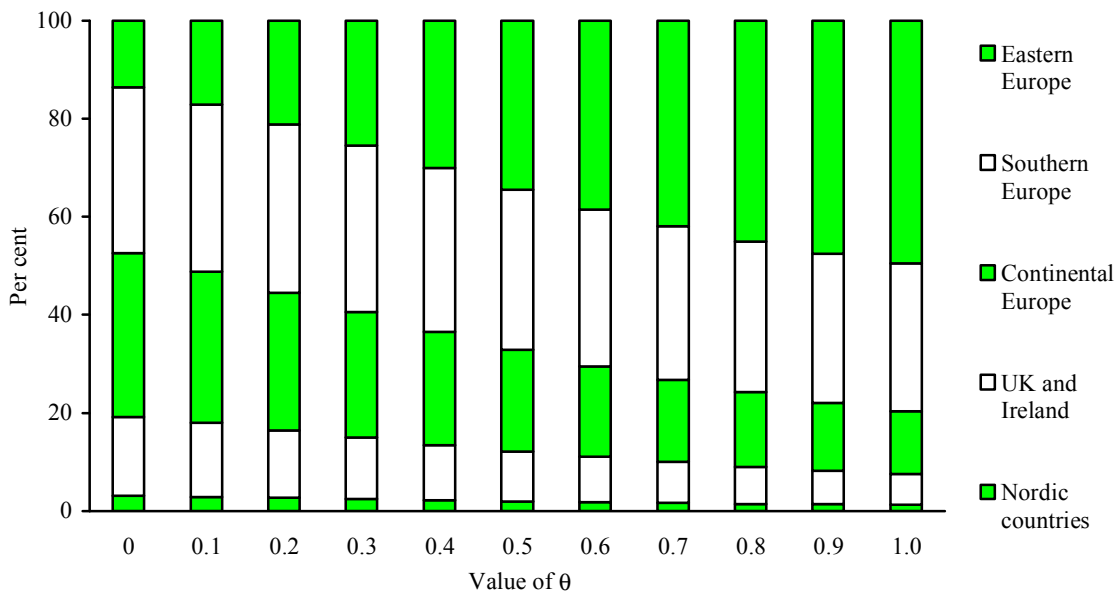
**SHARE OF PEOPLE MOVING INTO POVERTY AS THE LINE IS CHANGED FROM NATIONAL TO EU-WIDE OR TO THEIR GEOMETRIC MEAN BY COUNTRY, 2000**



Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equivalized by the modified OECD equivalence scale, are not adjusted to national accounts and are in PPS (GDP).

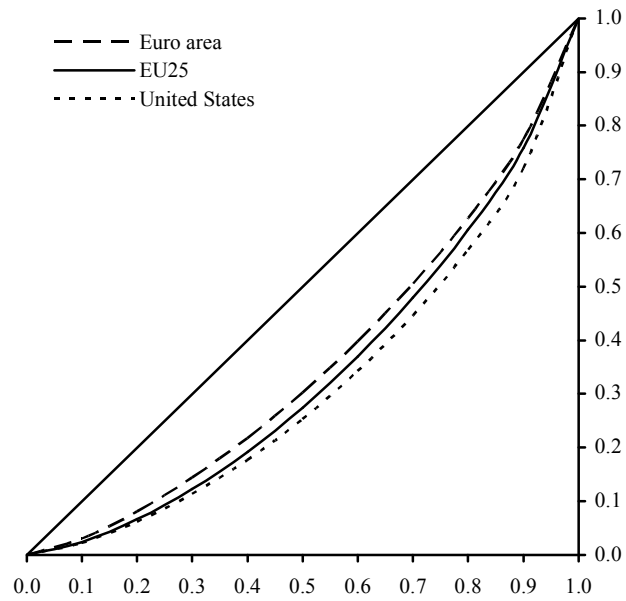
Figure 5

**POVERTY COMPOSITION IN EU25 BY ALTERNATIVE VALUES OF  $\theta$ , 2000**  
(per cent)



Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equivalized by the modified OECD equivalence scale, are not adjusted to national accounts and are in PPS (GDP).  $\theta$  is the weight assigned to the EU-wide line and  $(1-\theta)$  to the national line.

Figure 6

**LORENZ CURVES FOR THE EURO AREA, THE EU25 AND THE USA, 2000**

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equivalized by the modified OECD equivalence scale, are not adjusted to national accounts and are in PPS (GDP).

Table 1

**PER CAPITA INCOME IN EU COUNTRIES AROUND 2000 IN PPS (GDP)**

Country	Year	Gross national income (GNI)	Household gross disposable income (HGDI) (1)	HGDI to GNI ratio	Household net disposable income (HNDI) (1)	HNDI to GNI ratio	ECHP-LIS total net household income (TNHI)	TNHI to GNI ratio	TNHI to HNDI ratio
Austria	2000	24.778	16.393	0.662	15.618	0.630	10.685	0.431	0.684
Belgium	2000	23.979	14.800	0.617	14.047	0.586	11.172	0.466	0.795
Cyprus	2000	15.824	–	–	–	–	–	–	–
Czech Republic	1996	11.316	6.595	0.583	6.258	0.553	4.331	0.383	0.692
Denmark	2000	24.819	11.790	0.475	10.951	0.441	11.233	0.453	1.026
Estonia	2000	7.916	5.103	0.645	4.775	0.603	3.145	0.397	0.659
Finland	2000	22.724	12.195	0.537	11.268	0.496	9.882	0.435	0.877
France	2000	23.125	14.939	0.646	14.433	0.624	10.507	0.454	0.728
Germany	2000	22.272	15.423	0.693	14.412	0.647	11.071	0.497	0.768
Greece	2000	14.749	11.028	0.748	10.342	0.701	6.835	0.463	0.661
Hungary	1999	9.156	5.768	0.630	–	–	3.318	0.362	–
Ireland	2000	21.807	–	–	16.783	0.770	8.784	0.403	0.523
Italy	2000	22.600	15.671	0.693	14.721	0.651	8.064	0.357	0.548
Latvia	2000	7.090	4.588	0.647	4.277	0.603	–	–	–
Lithuania	2000	7.530	5.213	0.692	4.947	0.657	–	–	–
Luxembourg	2000	38.889	–	–	–	–	15.957	0.410	–
Malta	2000	15.325	–	–	–	–	–	–	–
Netherlands	2000	25.506	13.263	0.520	12.460	0.489	10.284	0.403	0.825
Poland	1999	8.579	6.228	0.726	6.064	0.707	3.438	0.401	0.567
Portugal	2000	15.757	11.362	0.721	10.594	0.672	6.477	0.411	0.611
Slovak Republic	1996	7.546	4.464	0.592	4.317	0.572	2.511	0.333	0.582
Slovenia (2)	1999	13.905	9.061	0.652	8.402	0.604	5.551	0.399	0.661
Spain	2000	18.390	12.410	0.675	11.711	0.637	7.927	0.431	0.677
Sweden	2000	23.701	11.817	0.499	11.408	0.481	10.156	0.428	0.890
UK	2000	22.521	15.251	0.677	14.542	0.646	11.894	0.528	0.818

Source: author's estimation from aggregate data (national accounts, population and conversion rates) drawn from Eurostat (2006), Central Statistics Office (2005) for Ireland, Hungarian Central Statistical Office (2006) for Hungary, and household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). (1) Except for Hungary, the household sector includes non-profit institutions serving households. (2) The series for household gross and net disposable income are available only since 2000: the figures for 1999 have been extrapolated by using the rate of growth of gross national income.

Table 2

## INEQUALITY MEASURES BY INCOME DEFINITIONS, 2000

Income definition	Atkinson index: $\epsilon=1$	Atkinson index: $\epsilon=2$	Gini index	Quintile ratio	Decile ratio	P10	P20	P80	P90
<i>European Union 25</i>									
Income in euros									
Unadjusted	0.258	0.815	0.378	3.8	9.2	22	43	161	206
Adjusted to GNI	0.234	0.802	0.361	3.5	7.8	26	46	157	198
Adjusted to HNDI	0.231	0.799	0.359	3.3	7.6	26	47	157	199
Income in PPS (GDP)									
Unadjusted	0.182	0.770	0.328	2.8	5.1	39	55	154	195
Adjusted to GNI	0.168	0.761	0.316	2.6	4.5	43	59	154	192
Adjusted to HNDI	0.168	0.758	0.317	2.6	4.5	44	59	154	194
Income in PPS (HFCE)									
Unadjusted	0.189	0.773	0.334	2.9	5.3	37	54	155	196
Population-weighted national values	0.138	0.395	0.284	–	–	–	–	–	–
<i>European Union 15</i>									
Income in euros									
Unadjusted	0.168	0.830	0.313	2.5	4.4	44	60	152	192
Adjusted to GNI	0.155	0.821	0.300	2.4	4.0	46	62	149	185
Adjusted to HNDI	0.153	0.818	0.298	2.4	4.0	47	63	149	187
Income in PPS (GDP)									
Unadjusted	0.148	0.799	0.294	2.3	3.8	48	64	148	185
Adjusted to GNI	0.143	0.791	0.289	2.3	3.7	49	65	149	184
Adjusted to HNDI	0.143	0.789	0.291	2.3	3.7	50	65	150	186
Income in PPS (HFCE)									
Unadjusted	0.150	0.801	0.296	2.3	3.9	48	63	148	186
Population-weighted national values	0.138	0.417	0.284	–	–	–	–	–	–
<i>Euro area</i>									
Income in euros									
Unadjusted	0.164	0.846	0.307	2.5	4.3	44	60	150	187
Adjusted to GNI	0.154	0.843	0.298	2.4	4.1	45	62	148	184
Adjusted to HNDI	0.152	0.841	0.296	2.4	4.0	46	62	148	184
Income in PPS (GDP)									
Unadjusted	0.146	0.823	0.290	2.3	3.8	48	63	146	183
Adjusted to GNI	0.142	0.820	0.288	2.3	3.7	49	65	149	184
Adjusted to HNDI	0.142	0.818	0.288	2.3	3.7	50	65	150	185
Income in PPS (HFCE)									
Unadjusted	0.149	0.825	0.293	2.4	3.9	47	63	147	183
Population-weighted national values	0.137	0.430	0.282	–	–	–	–	–	–
<i>United States of America</i>									
Income in US dollars	0.225	0.966	0.369	3.0	5.4	39	55	163	213
Income in PPS	0.224	0.966	0.368	2.9	5.4	39	55	162	212

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equivalized by the modified OECD equivalence scale. P10, P20, P80 and P90 are the ratios to the median of the 10th, 20th, 80th and 90th percentiles, respectively. The quintile and decile ratios are the ratios P80/P20 and P90/P10.

Table 3

## INEQUALITY MEASURES BY EQUIVALENCE SCALES, 2000

Equivalence scale	Atkinson index: $\epsilon=1$	Atkinson index: $\epsilon=2$	Gini index	Quintile ratio	Decile ratio	P10	P20	P80	P90
<i>European Union 25</i>									
Modified OECD	0.182	0.770	0.328	2.8	5.1	39	55	154	195
OECD	0.189	0.764	0.336	2.8	5.2	38	55	157	199
Per capita	0.209	0.759	0.357	3.1	5.7	37	54	164	211
Mixed OECD (1)	0.197	0.773	0.338	2.9	5.7	34	53	154	196
<i>European Union 15</i>									
Modified OECD	0.148	0.799	0.294	2.3	3.8	48	64	148	185
OECD	0.154	0.792	0.301	2.4	3.9	48	64	151	189
Per capita	0.174	0.786	0.324	2.5	4.4	46	62	158	201
<i>Euro area</i>									
Modified OECD	0.146	0.823	0.290	2.3	3.8	48	63	146	183
OECD	0.152	0.816	0.298	2.4	3.9	48	63	149	187
Per capita	0.171	0.810	0.320	2.5	4.4	46	62	157	199
<i>United States of America</i>									
Modified OECD	0.224	0.966	0.368	2.9	5.4	39	55	162	212
OECD	0.232	0.968	0.377	3.0	5.7	39	55	166	221
Per capita	0.255	0.973	0.399	3.3	6.5	37	54	176	242

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are not adjusted to national accounts and are in PPS (GDP for EU countries). P10, P20, P80 and P90 are the ratios to the median of the 10th, 20th, 80th and 90th percentiles, respectively. The quintile and decile ratios are the ratios P80/P20 and P90/P10. (1) Modified OECD equivalence scale for countries in EU15, OECD equivalence scale for new member countries.

Table 4

**HEAD-COUNT POVERTY RATIOS BY INCOME DEFINITIONS, 2000**  
(per cent)

Income definition	Value of $\theta$										
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
<i>European Union 25</i>											
Income in euros											
Unadjusted	15.2	16.1	17.6	19.6	21.6	23.5	25.0	26.0	26.8	27.4	27.9
Adjusted to GNI	15.2	16.0	17.2	18.9	20.6	22.4	23.8	24.9	25.8	26.3	26.7
Adjusted to HNDI	15.2	15.9	17.1	18.7	20.4	21.9	23.3	24.4	25.1	25.7	26.0
Income in PPS (GDP)											
Unadjusted	15.2	15.5	16.0	16.6	17.4	18.4	19.4	20.4	21.4	22.2	23.0
Adjusted to GNI	15.2	15.4	15.8	16.1	16.7	17.2	17.9	18.7	19.4	20.2	20.9
Adjusted to HNDI	15.2	15.4	15.6	16.0	16.4	16.9	17.6	18.3	19.0	19.7	20.4
Income in PPS (HFCE)											
Unadjusted	15.2	15.6	16.1	16.8	17.7	18.8	19.9	21.0	22.1	23.0	23.7
<i>European Union 15</i>											
Income in euros											
Unadjusted	15.5	15.8	16.0	16.3	16.7	17.1	17.6	18.2	18.7	19.4	19.9
Adjusted to GNI	15.5	15.7	15.9	16.1	16.4	16.7	17.1	17.4	17.8	18.1	18.6
Adjusted to HNDI	15.5	15.6	15.8	16.0	16.1	16.4	16.7	16.9	17.3	17.7	18.0
Income in PPS (GDP)											
Unadjusted	15.5	15.6	15.8	15.9	16.0	16.2	16.3	16.6	16.7	17.0	17.3
Adjusted to GNI	15.5	15.4	15.6	15.6	15.7	15.8	15.9	16.0	16.1	16.2	16.4
Adjusted to HNDI	15.5	15.4	15.5	15.5	15.6	15.6	15.7	15.8	15.9	16.0	16.1
Income in PPS (HFCE)											
Unadjusted	15.5	15.7	15.8	15.9	16.2	16.3	16.5	16.8	17.1	17.3	17.7
<i>Euro area</i>											
Income in euros											
Unadjusted	15.4	15.7	16.0	16.3	16.7	17.2	17.7	18.3	19.0	19.6	20.3
Adjusted to GNI	15.4	15.5	15.9	16.2	16.4	16.8	17.1	17.5	17.9	18.4	18.8
Adjusted to HNDI	15.4	15.5	15.8	16.0	16.3	16.5	16.8	17.2	17.6	18.0	18.4
Income in PPS (GDP)											
Unadjusted	15.4	15.5	15.6	15.9	16.0	16.3	16.5	16.6	17.0	17.2	17.5
Adjusted to GNI	15.4	15.3	15.4	15.4	15.6	15.7	15.8	15.9	16.0	16.1	16.3
Adjusted to HNDI	15.4	15.3	15.4	15.4	15.5	15.5	15.7	15.7	15.8	16.0	16.1
Income in PPS (HFCE)											
Unadjusted	15.4	15.5	15.7	16.0	16.1	16.4	16.7	17.0	17.3	17.7	18.1
<i>United States of America</i>											
Income in US dollars	22.8	22.8	22.8	22.8	22.9	23.0	23.1	23.1	23.2	23.3	23.4
Income in PPS	22.8	22.8	22.8	22.9	22.9	22.9	23.0	23.0	23.1	23.1	23.2

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equalized by the modified OECD equivalence scale.  $\theta$  is the weight assigned to the EU-wide line and  $(1-\theta)$  to the national line.

**TOTAL IN POVERTY BY INCOME DEFINITIONS, 2000**  
(millions of persons)

Income definition	Value of $\theta$										
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
<i>European Union 25</i>											
Income in euros											
Unadjusted	67.7	71.9	78.2	87.4	96.2	104.8	111.2	115.9	119.5	122.1	124.2
Adjusted to GNI	67.7	71.3	76.5	84.4	91.9	99.6	105.9	110.9	114.8	117.2	119.0
Adjusted to HNDI	67.7	70.9	76.1	83.2	90.8	97.6	103.9	108.7	112.0	114.6	115.8
Income in PPS (GDP)											
Unadjusted	67.7	69.2	71.1	73.9	77.5	81.9	86.2	91.0	95.3	99.0	102.6
Adjusted to GNI	67.7	68.6	70.2	71.8	74.3	76.5	79.7	83.1	86.4	90.1	93.2
Adjusted to HNDI	67.7	68.6	69.6	71.1	73.2	75.4	78.5	81.6	84.8	87.9	91.0
Income in PPS (HFCE)											
Unadjusted	67.7	69.4	71.9	74.7	78.9	83.7	88.8	93.5	98.3	102.2	105.7
<i>European Union 15</i>											
Income in euros											
Unadjusted	57.3	58.4	59.2	60.5	61.8	63.4	65.2	67.4	69.0	71.9	73.8
Adjusted to GNI	57.3	58.0	58.8	59.7	60.8	61.9	63.1	64.3	65.8	66.8	68.9
Adjusted to HNDI	57.3	57.7	58.3	59.0	59.8	60.7	61.7	62.7	64.0	65.5	66.7
Income in PPS (GDP)											
Unadjusted	57.3	57.7	58.3	58.7	59.4	60.0	60.4	61.5	62.0	63.0	63.8
Adjusted to GNI	57.3	57.1	57.6	57.8	58.1	58.4	58.9	59.1	59.6	60.1	60.5
Adjusted to HNDI	57.3	57.1	57.2	57.4	57.7	57.8	58.2	58.5	58.8	59.2	59.4
Income in PPS (HFCE)											
Unadjusted	57.3	58.1	58.4	58.8	59.9	60.2	61.1	62.1	63.1	64.1	65.6
<i>Euro area</i>											
Income in euros											
Unadjusted	45.8	46.6	47.6	48.5	49.9	51.1	52.8	54.4	56.6	58.5	60.4
Adjusted to GNI	45.8	46.3	47.3	48.1	48.9	49.9	51.0	52.2	53.4	54.9	56.1
Adjusted to HNDI	45.8	46.2	46.9	47.6	48.4	49.0	50.2	51.3	52.4	53.7	54.9
Income in PPS (GDP)											
Unadjusted	45.8	46.2	46.6	47.4	47.7	48.5	49.1	49.5	50.5	51.3	52.0
Adjusted to GNI	45.8	45.6	46.0	46.0	46.4	46.7	47.0	47.3	47.8	48.1	48.5
Adjusted to HNDI	45.8	45.6	45.9	45.9	46.1	46.3	46.6	46.8	47.1	47.5	47.8
Income in PPS (HFCE)											
Unadjusted	45.8	46.2	46.6	47.6	48.1	49.0	49.6	50.6	51.6	52.9	53.8
<i>United States of America</i>											
Income in US dollars	64.3	64.4	64.4	64.5	64.7	65.0	65.2	65.3	65.6	65.9	66.2
Income in PPS	64.3	64.4	64.5	64.6	64.7	64.8	64.9	65.1	65.2	65.3	65.5

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are equalized by the modified OECD equivalence scale.  $\theta$  is the weight assigned to the EU-wide line and  $(1-\theta)$  to the national line.



Table 6

**HEAD-COUNT POVERTY RATIOS BY EQUIVALENCE SCALES, 2000**  
(per cent)

Equivalence scale	Value of $\theta$										
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
<i>European Union 25</i>											
Modified OECD	15.2	15.5	16.0	16.6	17.4	18.4	19.4	20.4	21.4	22.2	23.0
OECD	15.5	15.8	16.3	16.8	17.6	18.5	19.5	20.5	21.4	22.3	23.0
Per capita	17.2	17.4	17.9	18.4	19.1	19.8	20.7	21.6	22.5	23.2	24.0
Mixed OECD (1)	15.3	15.7	16.3	17.2	18.3	19.6	20.8	22.0	22.9	23.7	24.3
<i>European Union 15</i>											
Modified OECD	15.5	15.6	15.8	15.9	16.0	16.2	16.3	16.6	16.7	17.0	17.3
OECD	15.7	15.8	15.9	16.0	16.2	16.4	16.5	16.7	17.0	17.2	17.5
Per capita	17.2	17.3	17.4	17.6	17.7	17.7	17.9	18.1	18.3	18.4	18.6
<i>Euro area</i>											
Modified OECD	15.4	15.5	15.6	15.9	16.0	16.3	16.5	16.6	17.0	17.2	17.5
OECD	15.7	15.8	15.8	16.0	16.2	16.3	16.6	16.8	17.1	17.5	17.8
Per capita	17.0	17.1	17.2	17.4	17.6	17.8	18.0	18.1	18.4	18.6	18.9
<i>United States of America</i>											
Modified OECD	22.8	22.8	22.8	22.9	22.9	22.9	23.0	23.0	23.1	23.1	23.2
OECD	22.9	22.9	22.9	22.9	23.0	23.1	23.1	23.2	23.2	23.3	23.4
Per capita	23.9	23.9	23.9	23.9	24.0	24.0	24.0	24.1	24.0	24.1	24.1

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are not adjusted to national accounts and are in PPS (GDP for EU countries).  $\theta$  is the weight assigned to the EU-wide line and  $(1-\theta)$  to the national line. (1) Modified OECD equivalence scale for countries in EU15, OECD equivalence scale for new member countries.

**TOTAL IN POVERTY BY EQUIVALENCE SCALES, 2000**  
(millions of persons)

Equivalence scale	Value of $\theta$										
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
<i>European Union 25</i>											
Modified OECD	67.7	69.2	71.1	73.9	77.5	81.9	86.2	91.0	95.3	99.0	102.6
OECD	69.2	70.2	72.4	74.7	78.3	82.4	86.9	91.3	95.4	99.3	102.6
Per capita	76.5	77.6	79.6	81.8	85.0	88.1	92.0	96.1	100.0	103.4	106.7
Mixed OECD (1)	68.2	70.1	72.8	76.7	81.6	87.1	92.5	97.9	102.2	105.5	108.4
<i>European Union 15</i>											
Modified OECD	57.3	57.7	58.3	58.7	59.4	60.0	60.4	61.5	62.0	63.0	63.8
OECD	58.2	58.4	58.8	59.2	59.8	60.6	61.0	61.7	63.0	63.8	64.7
Per capita	63.8	64.1	64.3	65.0	65.5	65.6	66.2	66.9	67.7	68.1	69.0
<i>Euro area</i>											
Modified OECD	45.8	46.2	46.6	47.4	47.7	48.5	49.1	49.5	50.5	51.3	52.0
OECD	46.7	46.9	47.2	47.6	48.3	48.6	49.5	50.0	50.9	52.0	52.9
Per capita	50.6	51.0	51.2	51.9	52.3	52.9	53.6	54.0	54.9	55.5	56.2
<i>United States of America</i>											
Modified OECD	64.3	64.4	64.5	64.6	64.7	64.8	64.9	65.1	65.2	65.3	65.5
OECD	64.7	64.8	64.7	64.7	65.0	65.2	65.4	65.5	65.6	65.7	66.0
Per capita	67.4	67.4	67.5	67.6	67.7	67.8	67.9	68.0	67.9	68.1	68.0

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Incomes are not adjusted to national accounts and are in PPS (GDP for EU countries).  $\theta$  is the weight assigned to the EU-wide line and  $(1-\theta)$  to the national line. (1) Modified OECD equivalence scale for countries in EU15, OECD equivalence scale for new member countries.

## Appendix

Table A1

**POVERTY COMPOSITION IN EU25 BY ALTERNATIVE INCOME DEFINITIONS, 2000**  
(per cent)

Country	Community-level poverty lines							National poverty lines	Share in EU population
	Income in euros		Income in PPS (GDP)						
	Unadjusted	Adjusted to GNI	Adjusted to HNDI	Unadjusted	Adjusted to GNI	Adjusted to HNDI	Unadjusted		
Austria	0.4	0.3	0.3	0.5	0.4	0.4	0.4	1.4	1.8
Belgium	0.4	0.5	0.6	0.5	0.7	0.9	0.5	2.0	2.3
Denmark	0.1	0.1	0.3	0.2	0.2	0.9	0.2	0.8	1.2
Finland	0.2	0.2	0.5	0.4	0.4	0.9	0.5	0.9	1.2
France	4.1	4.5	4.5	5.3	6.0	6.1	5.6	13.9	13.6
Germany	3.1	4.6	4.2	5.2	7.7	6.9	4.1	13.4	18.5
Greece	4.7	5.1	4.5	3.8	4.4	3.7	4.2	3.3	2.5
Ireland	0.5	0.4	0.1	0.7	0.6	0.2	0.7	1.2	0.9
Italy	12.9	8.1	7.4	12.5	8.1	7.7	12.8	16.2	12.8
Luxembourg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Netherlands	1.0	0.8	1.6	1.4	1.0	2.2	1.2	2.7	3.6
Portugal	5.1	5.0	4.6	4.2	4.1	3.6	4.1	3.0	2.3
Spain	11.8	11.3	11.0	9.7	9.7	9.3	9.5	11.2	9.0
Sweden	0.3	0.3	0.6	0.6	0.6	1.5	0.7	1.4	2.0
UK	3.0	5.0	4.6	5.6	9.4	8.7	5.3	14.9	13.2
Czech Republic	8.0	8.2	8.6	6.1	5.0	6.4	6.1	1.3	2.3
Estonia	1.1	1.1	1.1	1.1	1.2	1.2	1.1	0.4	0.3
Hungary	8.1	8.3	8.6	8.1	7.3	9.1	8.0	2.0	2.3
Poland	30.0	30.8	31.0	28.8	28.5	24.8	29.6	8.6	8.6
Slovak Republic	4.3	4.5	4.6	4.8	4.1	4.7	4.7	0.9	1.2
Slovenia	1.1	1.0	1.0	0.7	0.5	0.6	0.7	0.4	0.4
Nordic countries	0.6	0.6	1.4	1.2	1.2	3.3	1.4	3.1	4.4
UK and Ireland	3.4	5.4	4.7	6.3	9.9	9.0	6.0	16.1	14.1
Continental Europe	8.9	10.6	11.3	12.8	15.9	16.5	11.9	33.4	39.9
Southern Europe	34.6	29.5	27.5	30.2	26.3	24.4	30.5	33.8	26.6
Eastern Europe	52.5	53.9	55.0	49.5	46.7	46.8	50.2	13.6	15.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006).

**POVERTY COMPOSITION IN EU25 BY ALTERNATIVE VALUES OF  $\theta$ , 2000**  
(per cent)

Country	Value of $\theta$											Share in EU popu- lation
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	
Austria	1.4	1.3	1.1	1.0	0.9	0.8	0.7	0.6	0.6	0.5	0.5	1.8
Belgium	2.0	1.8	1.6	1.4	1.3	1.1	0.9	0.8	0.7	0.6	0.5	2.3
Denmark	0.8	0.8	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.2	0.2	1.2
Finland	0.9	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	1.2
France	13.9	12.8	11.8	10.8	9.7	8.6	7.7	7.0	6.3	5.8	5.3	13.6
Germany	13.4	12.4	11.2	10.0	9.1	8.2	7.3	6.6	6.2	5.6	5.2	18.5
Greece	3.3	3.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.8	3.8	2.5
Ireland	1.2	1.1	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.9
Italy	16.2	16.3	16.0	15.8	15.2	14.6	14.1	13.5	13.1	12.7	12.5	12.8
Luxembourg	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Netherlands	2.7	2.5	2.4	2.3	2.1	1.9	1.8	1.7	1.5	1.4	1.4	3.6
Portugal	3.0	3.2	3.5	3.5	3.7	3.9	3.9	3.9	4.0	4.1	4.2	2.3
Spain	11.2	11.2	11.2	11.0	10.8	10.6	10.4	10.1	9.9	9.7	9.7	9.0
Sweden	1.4	1.3	1.2	1.1	1.0	0.9	0.8	0.8	0.7	0.7	0.6	2.0
UK	14.9	13.9	12.6	11.5	10.3	9.3	8.4	7.7	6.8	6.2	5.6	13.2
Czech Republic	1.3	1.6	2.1	2.5	3.1	3.7	4.3	4.8	5.3	5.7	6.1	2.3
Estonia	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.1	0.3
Hungary	2.0	2.6	3.4	4.3	5.0	5.8	6.4	7.0	7.4	7.8	8.1	2.3
Poland	8.6	10.7	12.9	15.3	17.8	20.2	22.4	24.2	26.0	27.6	28.8	8.6
Slovak Republic	0.9	1.3	1.7	2.1	2.7	3.2	3.8	4.2	4.5	4.7	4.8	1.2
Slovenia	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.4
Nordic countries	3.1	2.9	2.7	2.4	2.2	2.0	1.8	1.7	1.5	1.3	1.2	4.4
UK and Ireland	16.1	15.1	13.7	12.5	11.3	10.1	9.2	8.5	7.5	6.8	6.3	14.1
Continental Europe	33.4	30.8	28.1	25.6	23.0	20.7	18.4	16.7	15.3	13.9	12.8	39.9
Southern Europe	33.8	34.1	34.3	34.1	33.5	32.7	32.0	31.3	30.7	30.3	30.2	26.6
Eastern Europe	13.6	17.1	21.1	25.4	30.0	34.4	38.5	41.9	45.0	47.6	49.5	15.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: author's estimation from household-level data from ECHP (Waves 1–8, December 2003) and LIS (as of 28 September 2006). Figures are computed on unadjusted incomes expressed in PPS (GDP).  $\theta$  is the weight assigned to the EU-wide line and  $(1-\theta)$  to the national line.

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