Cross-national differences in determinants of multiple deprivation in Europe

Francesco Figari[1]

Preliminary version. April 10, 2006

Abstract

This paper analyses the socio-economic determinants of multiple deprivation in eleven European countries. Random and fixed effects models are estimated using all eight waves of the European Community Household Panel (ECHP). A decomposition of the deprivation gaps between countries, into characteristics and returns components, allows us to quantify the potential contribution of each socio-economic factor, other than income, in reducing the national deprivation level. First, the results show that changes in income and deprivation do not strictly coincide and that lagged income has a larger effect than current income. Second, they highlight the importance of employment status and of moving into and out of the labour market and the value of income sources, higher education and home ownership. The results confirms the great heterogeneity of European countries and the peculiarity of the South. Nevertheless, in the Southern countries the achievement of higher education, good housing conditions and income itself have a strong effect in reducing the deprivation differential.

JEL: I31, I32, C23

Keywords: multiple deprivation, ECHP, panel analysis

[1] ISER - University of Essex and DI.S.E.FIN. - University of Genova. Email: ffigar@essex.ac.uk
I would like to thank Stephen Jenkins and Mark Bryan for their supervision, Chiara Pronzato and the participants in the seminar in ISER in July 2005 for their comments. A previous version of this paper, focused on Italy, was presented at the XVII SIEP Conference (Italy) in September 2005. Financial support from the European Commission – Jean Monnet Programme is gratefully acknowledged. The ECHP data are used with the permission of Eurostat, who bear no responsibility for the analysis or interpretation presented here. All errors remain the responsibility of the author.

1. Introduction

This paper aims to analyse the socio-economic determinants of multiple deprivation in Europe. The theoretical rationale is that a widely accepted definition of poverty includes both input and outcome elements (Townsend 1979). In such a multidimensional framework, current income is a key element but other economic attainments also have an effect on the level of social exclusion an individual faces. Following this approach the term "income poverty" refers to input elements as a lack of resources, while the term "deprivation" refers outcome elements as poor living conditions.

Measures of income poverty and deprivation summarize dissimilar phenomena and identify different individuals as being at risk of low living standards. Individuals with the same resources may suffer different deprivation levels, mainly due to the effects of accumulated resources, employment status, educational level, health conditions, housing tenure and social benefits. Income alone may measure just one dimension, albeit an important one, of poverty experienced by an individual (Atkinson 1975).

This paper estimates the relationship between income poverty and deprivation in eleven European countries and explores the reasons for the mismatch between these measures. Exploiting the longitudinal nature of the European Community Household Panel (ECHP), random and fixed effects models are estimated, separately for each country, in order to quantify the role of the socio-economic determinants, in addition to current and lagged income, in explaining deprivation.

The analysis shows that there are large differences in deprivation levels and determinants across countries. A decomposition of the deprivation gaps across countries, into differences in characteristics and differences in returns components, allows us to examine the main reasons for the deprivation differentials across Europe and to quantify the potential contribution of each socio-economic factor, as well as income, to closing the gap.

The paper is structured as follows. The next section introduces the theoretical background and reviews recent empirical research about the European Union. The data are presented in section 3 followed by the deprivation measurement technique and some descriptive statistics in section 4. The econometric specification is explained in section 5, and the estimates presented in section 6. Section 7 concludes

the paper with a summary of the results and some discussion of potential further developments.

2. Poverty conceptualisation and related work

The well-established multidimensional nature of poverty requires a comprehensive definition of poverty that includes both input and outcome elements. Townsend introduced such a definition, recognizing poverty in relative terms as exclusion from the minimum living standards due to inadequate resources. He stated that:

> "Individuals, families and groups in the population can be said to be in poverty when they lack the resources to obtain the type of diet, participate in the activities and have the living conditions and amenities which are customary, or at least widely encouraged or approved, in the societies to which they belong. Their resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary living patterns, customs and activities" (Townsend 1979: 31).

However Ringen (1987, 1988) argued that both the concept and the measurement of poverty should be considered either indirectly or directly. As an indirect concept, poverty refers to insufficient resources, capabilities or rights to achieve a minimum standard of life and it should be measured by income or other resource indicators. As a direct concept, poverty refers to the exclusion from the ordinary way of life in terms of consumption, leisure and social activities and it should be measured by consumption or other way of life indicators. Such direct exclusion from minimum living standards is often called deprivation (Nolan and Whelan 1996) and can be considered as an implicit measure of living standards derived from a set of non-monetary indicators. The traditional income poverty measures indicate a lack of resources (input element) reflecting a state of potential exclusion, while the deprivation indicators denote low living conditions (outcome element) capturing a state of actual exclusion. The policy perspective of the two approaches is different: the income poverty refers to inequality of opportunity while the deprivation refers to inequality of outcomes, although other factors on addition to income, such employment status, health condition, education level and housing tenure, can influence the opportunity set of an individual (Perry 2002).

The relationship between current income measures and living conditions indicators is not straightforward and their use in the assessment of poverty presents both advantages and disadvantages. On the one hand, low current income is a well-

recognised indicator of indirect poverty but it suffers at least from three limitations: i) it deals with resources and not with living standards, ii) it does not take into account resource accumulation and more stable economic lifestyle indicators, and iii) it can suffer from measurement errors, especially at the bottom and the top of the distribution (Rendtel et al. 2004). As summed up by Ringen (1988), "income is not a reliable measure of poverty once poverty is defined directly. It is an arbitrary measure, empirically as well as theoretically". Consumption levels rather than income could be a better measure of living conditions although expenditure data, when available and accurate, do not focus on items with a durable economic life or social impact (Atkinson et al. 2002). On the other hand, non-monetary indicators can compensate for such limitations because they i) provide direct measure of exclusion due to the enforced lack of durables, leisure and social activities and housing facilities and ii) measure a situation which is more stable over time. However, non-monetary indicators present other weaknesses that are discussed in Section 4.

A complementary way to consider both input and outcome elements of poverty in a multidimensional framework has been suggested by Ringen:

> "Resource indicators alone can only say something about the probability of deprivation in way of life. Low income, for example, at least as we are able to measure it, may represent only a temporary and atypical situation… On the other hand, to rely on way of life indicators alone, that is, to go all out for direct measurement, is also insufficient since people may live as if they were poor without being poor … We need to establish not only that people live as if they were poor but that they do so because they do not have the means to avoid it" (Ringen 1987:161-62).

Some empirical work applies this twin-criteria approach to measuring consistent poverty defined, as the combination of a low income and deprivation condition (Nolan and Whelan 1996, Layte et al. 2000).

From a policy point of view, a range of information rather than a single indicator such as income should be considered in order to identify those suffering from social exclusion (Atkinson et al., 2002). In the European Union, although each member state is responsible for social policies, the availability of reliable and accurate quantitative multidimensional indicators is considered one of the most important tools for monitoring the Lisbon Strategy to combat poverty and social exclusion as confirmed by the conclusion of Laeken Summit in December 2001. Some countries, such as Austria and Ireland, have already included a set of non-monetary indicators in the

poverty measures in their National Action Plans on Social Inclusion. The Irish government adopted a definition which states that

> "people live in poverty if their income and resources (material, cultural and social) are so inadequate as to preclude them from having a standard of living which is regarded as acceptable by Irish society generally" (National Anti-Poverty Strategy 1997).

In addition the UK government has included some deprivation indicators in the child poverty measurement strategy (DWP 2003).

It is widely recognised that "defining poverty solely in terms of income exposes us to the danger of failing to identify those groups most at risk of exclusion from customary life-standards" (Whelan et al. 2004b). Measures of income poverty and deprivation summarize dissimilar phenomena and identify different subjects as being at risk of low living standards. The empirical evidence at the European level is due to the substantial contribution of Nolan, Whelan, Layte and Maitre (among others: Nolan and Whelan 1996; Layte et al. 2001a, 2001b; Whelan et al. 2001, 2002a, 2002b, 2003, 2004a, 2004b). They focused on methodological measurement aspects, the identification of different dimensions of deprivation, the relationship between income poverty and deprivation, the determinants of persistent poverty and persistent deprivation and the impact of deprivation on economic strain. Despite the differences across countries, the relationship between income and deprivation is always weaker than it could be generally assumed. They highlighted the limited overlap between poor and deprived individuals also considering persistent measures of poverty and deprivation. Recent work (Whelan and Maitre 2005) confirms, even taking into account measurement errors, the main findings of previous researches about the contrast between income poverty persistence and deprivation persistence are consistent. Layte et al (2001b) and Muffels and Fouarge (2004) focused on the role of different welfare regimes, without distinguishing between countries, in explaining the effect of income variations on the deprivation level that is very low in social-democratic and corporatist regimes and higher in liberal and Mediterranean regimes. Other studies, focused on the British case, are interesting especially from a methodological point of view. Mack and Lansley (1985) and Gordon et al. (2000) used a deprivation index to identify the poor households directly. A hardship index, based on a set of social indicators, has been developed by the Policy Studies Institute (Vegeris and McKay 2002, Vegeris and Perry 2003) since 1991 and recently refined

using the Families and Children Study (FACS). It includes nine dimensions about housing hardship, financial problems and expenditure deprivation and classifies each household according to its hardship (none, moderate or severe). Berthoud, Bryan and Bardasi (2004) examined the longitudinal relationship between income (and other determinants) and deprivation over time, using both the Families and Children Study (FACS) and the British Household Panel Survey (BHPS). They highlighted the importance of a recalibration of the deprivation index every year and the unreliability of the low income data.

3. Data

The analysis of this paper is based on the European Community Household Panel (ECHP), a harmonised longitudinal survey of a representative sample of households of fifteen (pre-enlargement 2004) European Union member States. It was collected annually between 1994 and 2001 and covered the data about demographic characteristics, employment and job history, income, training and education, health, social relations, migration, and satisfaction of each individual older than 16 years of age. Supplementary information was collected about the composition, financial situation and accommodation of the household.

Germany, Luxemburg and the United Kingdom were omitted from the analysis due to the lack or a different formulation of some questions related to the non monetary indicators, while Sweden was excluded because the national survey is not a panel. In 2000 the samples sizes range from more than 12500 individuals in Italy to just fewer than 4000 individuals in Denmark (see Table A1 in Annex I for details).

The ECHP covers the 24 non-monetary indicators considered by Eurostat (2002) in its report on Income Poverty and Social Exclusion. They are used to define a deprivation index as explained in the next section. Such indicators are available at the household level and then attributed to each individual assuming that the resources are shared equally among all household members (Donnison 1988). The unit of longitudinal analysis in this paper are the individuals also because it is feasible to follow them across the waves imputing to each of them the deprivation score and the socio-economic characteristics of the household they belong to in each wave.

Two measures of income are provided in the ECHP: “current monthly income” and “annual income”. The latter has been chosen because it is less volatile and it is a better indicator of living standards at each point in time although consumption

smoothing is rare among individuals at the bottom of income distribution (Bradbury et al. 2002). It represents the total annual net household income (including transfers and after deduction of income tax and social security contributions) and it is based on detailed questions to each member of the household (Berthoud 2004). Nevertheless, in the ECHP each individual is asked to report annual income possessed in the previous calendar year: in order to link the deprivation score to contemporaneous income we impute to each individual in a given year the income provided in the subsequent wave of the survey. Moreover, in order to allow longitudinal and cross-countries analysis to be made, net income has been deflated to 2000 prices in each country, using the Harmonised Consumer Price Index (HCPI) provided by Eurostat, and expressed in purchasing power standards (PPS). Top and bottom one percent of incomes have been dropped in each country every year. In the descriptive statistics net income values have been adjusted to take into account household size and composition using the modified OECD equivalence scale. However in the regressions we use a logarithmic specification of unequivalized net income, more sensitive to variations at the bottom of the income distribution and we control directly for household size and composition.

The other explanatory variables are education level (i.e. less or more than secondary high school), employment status (i.e. employed, unemployed or inactive; experience of unemployment in the previous year), health status (i.e. good or bad), membership of clubs and societies, housing tenure (i.e. living in own house, own house with outstanding mortgage, rented house or free-rented house) and social transfers. Some of them refer both to the household head and the household members. In the first case, we have derived the person responsible for the household considering the demographic structure of it and not the reference person provided by the ECHP. In the second case we consider the proportion of household members with a given characteristic with respect to those potentially entitled for such characteristic.

In order to measure directly the impact of the family characteristics on the deprivation score we include variables related to the family composition, the proportion of elderly in the family, the number of adults and the square of the number of children to take into account the increasing marginal effect of each additional child (Berthoud et al. 2004).

Due to poor quality of the variables related to the education level, these have been corrected in each country replying the first information provided in case of inconsistencies across the panel and modifying the information if it does not respect

the minimum age for the achievement of a given degree. Then they have been aggregated into just one dummy variable referring to the possession of a secondary high school level or more.

In order to test whether type and amount of social transfers matter dummy variables were included for each type of transfer. Each dummy takes value one if the amount received is at least equal to a threshold that corresponds, in each country, to the 25^{th} percentile of the ratio of the transfer received and the total annual income.

A dummy variable for each year is also included in the analysis to control for common aggregate effects and time trends. (see Table A8 in Annex I for descriptive statistics).

4. Deprivation measurement approach and descriptive statistics

Any deprivation measurement approach concerns the proper way to choose the non-monetary indicators, the underlying dimensions of deprivation to be identified, the aggregation of the indicators into an overall index, the weighing procedure to adjust it over time and within countries and the identification of a deprivation threshold. A review of these measurement issues with many references to international work is Nolan and Whelan (1996).

Due to the absence of an objective way of choosing the indicators, in the literature the selection has focused on those possessed by a majority (Townsend, 1979) or those socially perceived as a necessity (Breadline Britain studies: Mack and Lansley, 1985; Gordon and Pantazis, 1997). The number of indicators should be as large as possible, so as to avoid the risk of an index being too sensitive to the selection (Gordon and Pantazis, 1997; Berthoud et al. 2004). However, using secondary datasets, the choice is often influenced and constrained by the availability of the variables rather than by a complete representation of the underlying concept of deprivation (Coombes et al. 1995). Nevertheless, the selection of the indicators should take into account the specificity of each country at each point in time in order to really represent what constitutes relative deprivation. The experience of the Breadline Britain studies shows that socially-defined minimum standards vary even within the short period of seven years (Gordon and Pantazis, 1997).

In order to define different underlying dimensions of deprivation, each associated with a distinct set of indicators, some authors (Callan et al. 1993, Nolan and Whelan 1996) applied a factor analysis. The analyses of this paper are based on the

classification proposed by Whelan et al. (2001): twenty-four non-monetary dichotomous indicators related to the possession or the affordability of different items (see Annex I for details) are used to derive the following five dimensions of deprivation:

1) *Basic life-style* concerning food, furniture, clothes, leisure activities, housing and financial situation.
2) *Secondary life-style* concerning the possession of durables goods.
3) *Housing facilities* concerning housing services and facilities.
4) *Housing deterioration* concerning structural elements of the house.
5) *Environment* concerning amenities of the house and environmental conditions of the neighbourhood.

The *Current life-style* (CLSD) dimension is the combination of the *Basic* and *Secondary life*-style dimensions and the *Overall* dimension is the combination of all previous five dimensions.

Table 1 shows the values of the Cronbach's alpha [2] and other correlation coefficients in order to test how the items of each dimension deal with the underlying deprivation concept and to estimate their reliability. A common threshold to judge if a dimension has been identified correctly is 0.60: the values, related to 2000, range from 0.65 (Denmark and the Netherlands) to 0.82 (Portugal) showing a high degree of reliability of the *Overall* dimension in particular in countries with a higher deprivation score. The correlation of each item with the others in the same dimension is uniform across countries with values slightly higher in the *Housing facilities* dimension. The correlation between the lack of each item and the equivalent income is always negative, with values higher in the *Basic* and *Secondary* dimensions.

< INSERT TABLE 1 HERE >

In order to derive an index of deprivation relative to both the country and the time we consider the possession of the items separately in each country and over time. Looking at the average number of the items lacking in the *Basic* dimension, the differences in absolute values across countries (with larger values in Portugal and

[2] Cronbach's alpha is a correlation index that shows the extent to which a set of questions are all associated with each other. When it is transformed for analysing the correlation between dichotomous indicators it is known as KR-20, abbreviation for Kurder-Richardson Formula 20.

Greece) are evident, as is the slightly decreasing trend within each country (see Figure 1).

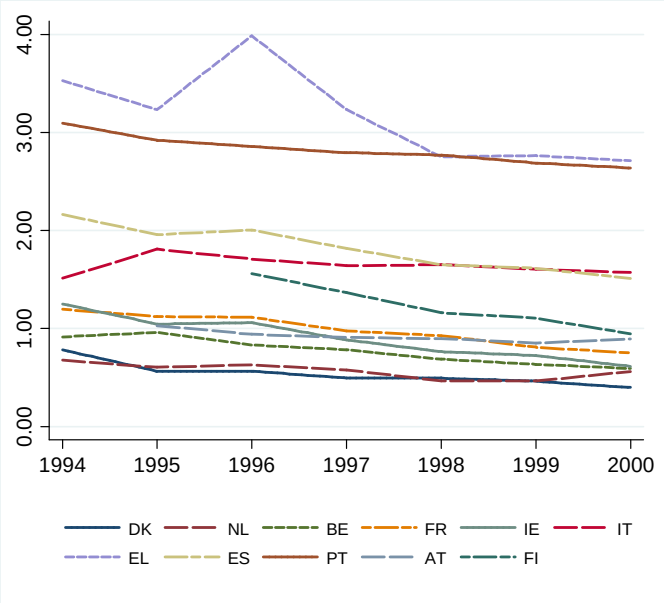

FIGURE 1: AVERAGE NUMBER OF ITEMS LACKING IN THE BASIC DIMENSION
(Notes. As for Table 1. Average numbers at household level using survey weights)

There are fewer differences across countries in the secondary dimension and the convergence of the Southern countries (i.e. Greece, Italy, Portugal and Spain) to the level of other countries is clearer (see Figure 2).

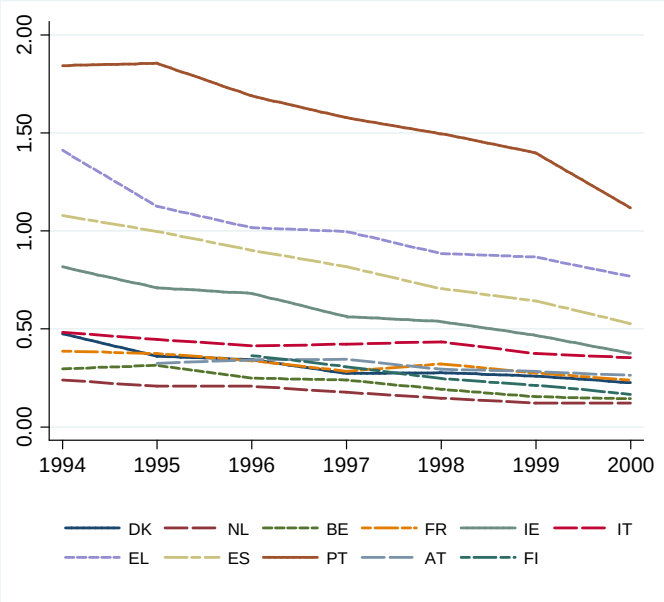

FIGURE 2: AVERAGE NUMBER OF ITEMS LACKING IN THE SECONDARY DIMENSION
(Notes. As for Table 1. Average numbers at household level using survey weights)

The decreasing trend in the lack of items can be associated with their easier availability over time due to lower prices and higher social perception of their importance. This implies the need to update the indicators (Gordon and Pantazis 1997) and recalibrate the index over time (Berthoud et al. 2004).

Starting from the set of *j* dichotomous indicators *I*, corresponding to the survey questions about the possession of a given item, at time *t* and for each household *h*

$$I_{hjt} = \begin{cases} 0 = possession \\ 1 = non\ possession \end{cases} \qquad \text{with j = 1, …, J}$$

different techniques have been applied to derive a deprivation index. Usually it has been obtained by raw sum of the indicators (Townsend, 1979; Mack and Lansley, 1985; Gordon et al., 2000; Whelan et al., 2001): each item is given an equal weight in such an additive scale without any consideration of the relative importance of it. Other techniques recognize the importance of defining the deprivation index in a relative way without considering any value judgements on the subjective necessity of a particular item (Muffels 1993, Hallerod 1995). Coombes et al. (1995) and Berthoud et al. (2004) used a Z-score technique based on the average value of standardised indicators in each year. In this paper a prevalence weighting procedure (Desai and Shah 1988, Vegeris and McKay 2002 and Vegeris and Perry 2003) has been applied, within each country and each wave.

The approach applied in this paper considers the sample proportion of household having an item in each wave as a weight

$$p_{jt} = 1 - \frac{\sum_{h=1}^{H} I_{hjt}}{H}$$

where the index $h = 1,...,H$ refers to the households, and it derives a weighted indicator for each item

$$I_{hjt}^{W} = I_{hjt}\, p_{jt}$$

A higher score, corresponding to the percentage of households owning the item, is given to the most commonly owned item. The final index is given by the sum of all weighted indicators

$$D_{ht} = \sum_{j=1}^{J} I_{hjt}^{W}$$

In order to be comparable across countries, it is normalised dividing it by the sum of all weights and, for simplicity of reading, it is multiplied by 100

$$D_{ht} = \frac{\sum_{j=1}^{J} I_{hjt}^{W}}{\sum_{j=1}^{J} p_{jt}} * 100$$

obtaining a score

$$D_{ht} \in [0,100]$$

at the household level. As already explained for the other socio-economic characteristics, this index has been attributed to the individuals, i.e. D_{it}, assuming that the deprivation level is shared equally among all household members (Donnison 1988).

In order to allow the comparability of the index over different years, Vegeris and McKay (2002) used always the weight of a given reference year. This avoids the extra variance due to the changes across the years, but it does not allow the trend in the possession of the durables to be considered properly. Utilizing country-specific and time-varying weights, this index compensates for variations in deprivation due to the trend of possession over time and social and cultural differences across countries.

It is important to mention that such a deprivation index is just an indicator and not a direct measure of deprivation. It is based on a weak set of assumptions (Berthoud et al. 2004), due to the questionable choice of the indicators (McKay and Collard 2004), their formulation in terms of non affordability or unwillingness (Mack and Lansley 1985, McKay 2004) and the focus on some specific areas of consumption. As a consequence the minimum value (i.e. zero after normalization) is not a censored point, because it cannot be considered as the direct realization of the true and latent deprivation value.

Concerning the deprivation threshold, many solutions have been proposed: Nolan and Whelan (1996) defined as deprived an individual with an enforced lack of at least one item in the basic life-style deprivation dimension without take into account the relative importance of each item and the other deprivation dimensions. Gordon and Townsend (1990) and Gordon et al. (2000) used different specifications of discriminant analysis to identify the deprivation score that best discriminates between deprived and non-deprived people. Nevertheless, in this paper, as in most previous

work, given the interest in the relationship between income poverty and deprivation, the income poverty line is used as a guide for the deprivation threshold. The deprivation line is defined in such a way to obtain the percentage of individuals "deprived" (i.e. with a household deprivation score above the deprivation line) as close as possible to the percentage of individuals "poor" (i.e. with household income below the poverty line).

Figure 3 shows the average overall deprivation score and the poverty rate (according to the income poverty line defined as 60% of median equivalent household income) across countries in the year 2000. Even after the prevalence weighting procedure applied within each country as outlined above, the differences are evident. Denmark had the lowest average overall deprivation score (equal to 5.07) and Portugal the highest (18.23). Over time the average overall deprivation score decreased in all countries but in particular in Ireland which improved its position in the country ranking. Although the deprivation score also decreased substantially in Spain, Greece and Portugal, they still remain at the bottom of the ranking (see Table A2 in Annex I). Generally the ranking of the countries by poverty is close to that by deprivation score with higher average deprivation in the countries with higher poverty rate: Ireland is an important exception showing a lower average deprivation than countries with the same poverty rate.

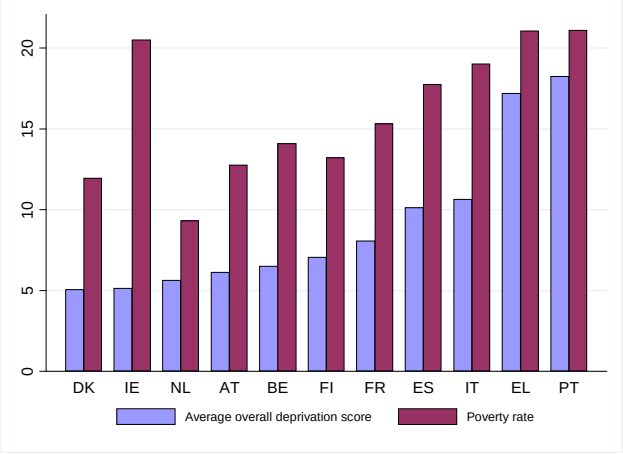

FIGURE 3: AVERAGE OVERALL DEPRIVATION SCORE AND POVERTY RATE– YEAR 2000
Poverty rate (%) according to the income poverty line defined as 60% of median equivalent household income. (Notes. As for Table 1)

Looking at other summary statistics of the overall deprivation score across countries (Table 2), it emerges clearly that the Southern countries face the worse

situation in terms of deprivation, not only in terms of average values. On the one hand, considering the proportion of household without any items lacking (i.e. with a deprivation score equal to zero), the lowest value is in Greece (1.84%) and the highest in Denmark (47.54%). On the other hand, the values at the top of the deprivation score distribution (i.e. the 99th percentile) range from 31.72 in the Netherlands to 63.41 in Portugal. The different shape of the distribution of the deprivation score is reflected by the measure of inequality of it: countries with a lower average deprivation show larger spikes at zero and lower maximum values, and consequently they have a higher inequality, measured by the coefficient of variation, of the deprivation score.

	AT	**BE**	**DK**	**EL**	**ES**	**FI**	**FR**	**IE**	**IT**	**NL**	**PT**
99th percentile	34,90	36,19	32,45	53,75	42,60	36,29	40,86	36,34	42,99	31,72	63,41
Average	6,12	6,49	5,07	17,2	10,13	7,05	8,05	5,13	10,64	5,62	18,23
S.d.	7,67	8,36	7,22	12,7	10,07	8,4	9,41	8,01	9,97	7,39	14,69
% with zero	35,16	36,39	47,54	1,84	21,53	32,86	29,97	46,81	15,30	38,20	7,00
Coeff. of Variation	1,253	1,287	1,424	0,738	0,994	1,192	1,168	1,559	0,937	1,314	0,806

TABLE 2: OVERALL DEPRIVATION SCORES. YEAR 2000.
(Notes. As for Table 1)

In order to analyse the relationship between income poverty and deprivation, we define the income poverty line as 60% of median equivalent household income and derive the corresponding deprivation line as explained above. This allows us to highlight the mismatch between current and persistent measures of income poverty and deprivation (see Table A3 in Annex I).

Considering the overall deprivation index, in Figure 4 we can see that the overlap between deprived and poor individuals, in the year 2000, varies from only 23% in Austria to 41% in Portugal. In other words, 77% of the poor in Austria are not deprived, 59% in Portugal and so on. If we look at the individuals poor and deprived over the last three years (i.e. respectively individuals persistently poor and persistently deprived), the overlap between them decreases substantially in all countries. This evidence confirms the limitations of income poverty measures in identifying individuals excluded by a minimum level of living standards (Layte et al. 2000, Whelan et al. 2002b). However if we consider the individuals who were persistently poor but deprived only in the last year, the overlap between them increases, highlighting the importance of understanding the temporal relationship between measures of income poverty and deprivation. (Nolan et al. 2001, Whelan et al. 2003).

It reinforces the opinion that a long term perspective should always be considered in order to determine living standards levels without excessive attention to short term movements into and out of income poverty or deprivation (Berthoud et al. 2004). Considering other sub-indices of deprivation, the mismatch is minimized even if the overlap is always far from perfect (Layte et al. 2000).

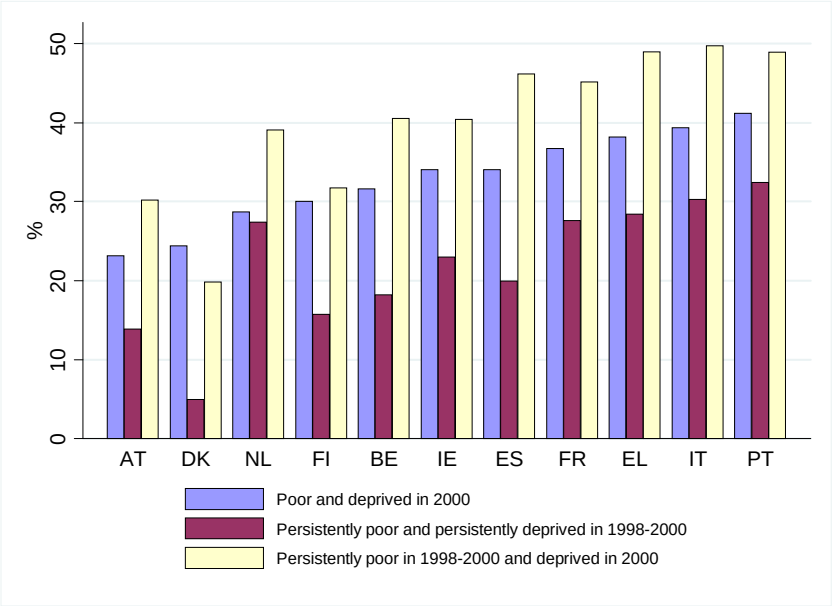

FIGURE 4: OVERLAP BETWEEN INCOME POVERTY AND OVERALL DEPRIVATION
(Notes. As for Table 1)

The correlation between deprivation indices and equivalent income also highlights this mismatch. The correlation is always negative (Table 3), with values ranging from 0.19 (for Denmark) to 0.41 (Greece), but it is lower than one could expect. In the countries with higher deprivation scores the correlation is higher: income guarantees a lower deprivation score in these countries than in others. Other sub-indices of deprivation are more related to income but not in a relevant way.

	Basic	Secondary	CLSD	House facilities	House deterioration	Environment	Overall
AT	-0,23	-0,12	-0,25	-0,08	-0,08	0,02	-0,20
BE	-0,24	-0,18	-0,25	-0,10	-0,07	-0,04	-0,22
DK	-0,20	-0,16	-0,22	-0,03	-0,05	-0,05	-0,19
EL	-0,45	-0,25	-0,45	-0,20	-0,19	0,01	-0,41
ES	-0,39	-0,25	-0,39	-0,08	-0,13	-0,01	-0,32
FI	-0,29	-0,17	-0,30	-0,08	-0,05	-0,05	-0,26
FR	-0,38	-0,25	-0,38	-0,11	-0,12	-0,05	-0,33
IE	-0,32	-0,22	-0,32	-0,04	-0,11	-0,07	-0,28
IT	-0,43	-0,18	-0,42	-0,05	-0,11	-0,08	-0,36
NL	-0,25	-0,17	-0,27	-0,01	-0,11	-0,05	-0,24
PT	-0,47	-0,34	-0,47	-0,21	-0,19	-0,02	-0,40

TABLE 3: CORRELATION BETWEEN INCOME AND DEPRIVATION INDICES. YEAR 2000.
(Notes. As for Table 1)

The extent of the overlap between income poverty and deprivation and the correlation between them suggests that income measures of poverty identify those suffering from low living standards more accurately in the poorest countries than in the others.

Nevertheless if we focus on the bottom of income distribution we can observe that in all countries with the exception of Denmark, the Netherlands, France and Italy, the average deprivation score of the poorest individuals is lower than that of some richer individuals. Figure 5 shows a local polynomial smooth of the average overall deprivation score within the first ten two-percentile income bands.

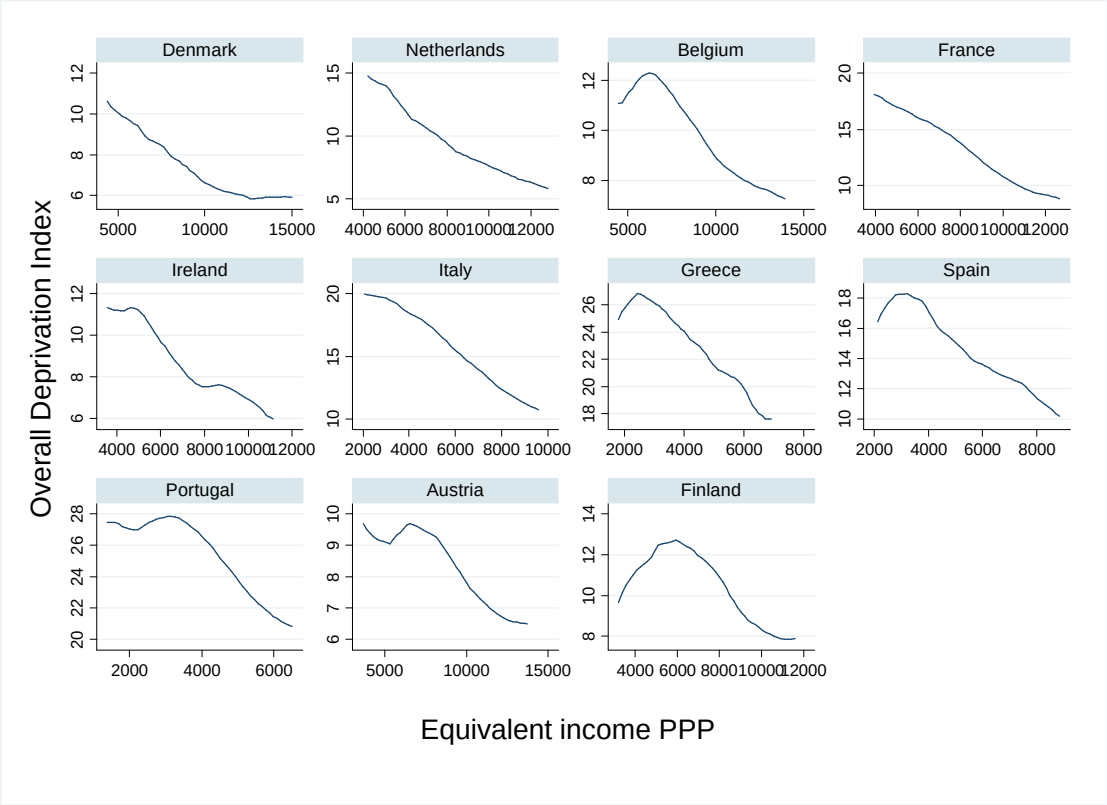

FIGURE 5: RELATIONSHIP BETWEEN INCOME AND OVERALL DEPRIVATION AT THE BOTTOM OF INCOME DISTRIBUTION
(Notes. As for Table 1)

A number of common reasons can be suggested for this surprising relationship and for the mismatch between income poverty and deprivation as well: short term fluctuations of income not immediately reflected in deprivation indicators, availability of resources previously purchased, past outlays for house or durables, accumulated savings or ability to borrow, support and non-cash benefits from family, neighbours or

public institutions, lower expectations of the poorest in terms of durables, facilities and social activities (Mayer 1993, Bradbury et al. 2001). Moreover at the bottom end of the income distribution, reported expenditure is often much greater than reported income (Adkin 1994) and also measurement errors can be more frequent (Rendtel et al. 2004). Another reason can be related to the fact that low income individuals are no longer aware or too embarrassed to recognize their own unaffordability of having items which most people have. On the contrary, other individuals with higher income can report lack of a given item due to priority in spending money on other items (Perry 2002).

5. Econometric model

In order to explore the socio-economic determinants of deprivation, exploiting the longitudinal nature of the dataset, we can specify the following two-way error component model

$$D_{it} = \alpha + \mathbf{x}_{it}\boldsymbol{\beta} + \gamma_t + v_i + \varepsilon_{it} \qquad 1)$$

The index $i = 1,...,N$ refers to the individuals while the index $t = 1,...,T$ refers to the waves. D_{it} *i*s the deprivation index obtained by the prevalence weighting procedure as explained in the previous section and it allows us to model deprivation without setting any arbitrary or income-based threshold. $\mathbf{x}_{it}$ is a vector of covariates that determine the deprivation level. They include the income of the household (*I)*, human capital endowments (*E*), labour market status (*J*), health conditions (*He*), house tenure status (*Ho*), social transfers received (*S*) and some household control variables (*C*). We include both the current and lagged values of most of the variables given the importance of the past socio-economic situation on the level of current deprivation. γ_t is a time-specific effect that it is treated including dummy variables for time periods among the other regressors. v_i is the individual-specific unobserved effect: it differs between individuals but, for any particular individual, it is constant over time. It captures individual unobserved heterogeneity (e.g. social condition, wealth, opportunities, life skills, support networks, unreported income) that usually it is not possible to control for in a cross-section analysis. ε_{it} is the error term with the standard properties: zero mean, no serial correlation, homoskedasticity, zero correlation with $\mathbf{x}_{it}$ and with v_i .

Given the nature of the index as just an indicator and not a direct measure of deprivation, we implement linear regressions rather than use other specifications, such as Tobit, that would be appropriate if the index were a direct measure of deprivation. In this case the index would present a censoring point as being the realization of the latent variable that, at least in principle could assume negative values. Our deprivation index is an indicator that has a large spike at zero in all countries corresponding to the value at which the individuals have all items covered by the survey questions. To take into account heteroskedasticity and to relax the assumption of independence within household (i.e. individuals from the same household can have the same observations) we computed the robust standard errors adjusted also for clustering by household.

Averaging over time the equation 1) considering $\overline{D_i}, \overline{\mathbf{x}_i}, \overline{\varepsilon_i}$ where $\overline{D_i} = \sum_{t=1}^{T_i} D_{it} \Big/ T_i$ we obtain

$$\overline{D_i} = \alpha + \overline{\mathbf{x}_i}\boldsymbol{\beta} + (v_i + \overline{\varepsilon_i}) \qquad 2)$$

whose OLS estimation gives us the "between" estimator $\hat{\boldsymbol{\beta}}_{BE}$.

Subtracting equation 2) from 1) we have

$$(D_{it} - \overline{D_i}) = (\mathbf{x}_{it} - \overline{\mathbf{x}_i})\boldsymbol{\beta} + (\varepsilon_{it} - \overline{\varepsilon_i}) \qquad 3)$$

the estimates of which provide fixed-effects, or "within" estimator, $\hat{\boldsymbol{\beta}}_{FE}$. The parameter α remains not identified. If we add in grand means (i.e. $\overline{\overline{D}}, \overline{\overline{\mathbf{x}}}, \bar{v}$ and $\overline{\overline{\varepsilon}}$, where $\overline{\overline{D}} = \sum_{i=1}^{N} \sum_{t=1}^{T_i} D_{it} \Big/ \sum_{i=1}^{N} T_i$, such that $\overline{\overline{D}} = \alpha + \overline{\overline{\mathbf{x}}}\boldsymbol{\beta} + \bar{v} + \overline{\overline{\varepsilon}}$) to the left- and right-hand sides of equation 3) and we assume $\bar{v} = 0$ it follows that

$$(D_{it} - \overline{D_i} + \overline{\overline{D}}) = \alpha + (\mathbf{x}_{it} - \overline{\mathbf{x}_i} + \overline{\overline{\mathbf{x}}})\boldsymbol{\beta} + (\varepsilon_{it} - \overline{\varepsilon_i} + \overline{\overline{\varepsilon}}) \qquad 4)$$

the estimates of which provide the same fixed-effects estimator $\hat{\boldsymbol{\beta}}_{FE}$ we would obtain from 3) but also an estimate of parameter α.

The random-effects estimator, $\hat{\boldsymbol{\beta}}_{RE}$, is a weighted average of the between and within estimators and it can be obtained as OLS estimator of the transformed model

$$(D_{it} - \vartheta\overline{D_i}) = (1-\vartheta)\alpha + (\mathbf{x}_{it} - \vartheta\overline{\mathbf{x}_i})\boldsymbol{\beta} + \{(1-\vartheta)v_i + (\varepsilon_{it} - \vartheta\overline{\varepsilon_i})\} \qquad 5)$$

where $\vartheta = 1 - \left(\frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2 + T\sigma_v^2} \right)^{\frac{1}{2}}$ is a function of the variance of v_i and ε_{it}. If the variance of $v_i \to 0$ then $\vartheta \to 0$ and the random effects estimator would converge to the pooled OLS estimator of the equation 1). If $T \to \infty$ then $\vartheta \to 1$ and the random effects estimator would converge to the fixed effects estimator.

The random effects approach assumes that the unobserved individual effects are uncorrelated with regressors, i.e. $E(v_i \mid \mathbf{x}_{it}) = 0$, while the fixed effects specification relaxes this condition. Which assumption regarding the correlation of the individual effects is more appropriate is a debatable issue. Moreover the fixed effects approach is costly in terms of degrees of freedom lost, but the random effects model can suffer from inconsistency due to omitted time-invariant variables.

The Hausman statistic given by

$$H = (\hat{\beta}_{FE} - \hat{\beta}_{RE})'[\mathbf{var}(\hat{\beta}_{FE}) - \mathbf{var}(\hat{\beta}_{RE})]^{-1}(\hat{\beta}_{FE} - \hat{\beta}_{RE})$$

can be used to compare directly the fixed effects estimator with the random effects estimator testing the assumption that individual effects are uncorrelated with the regressors. Under the null hypothesis

$$H_0 : E(v_i | \mathbf{x}_{it}) = 0$$

the test statistic is distributed as χ_k^2 with *k* equal to the number of elements in $\boldsymbol{\beta}$. If the null hypothesis is not rejected, the individual effects are uncorrelated with regressors and both the random effects and the fixed effects estimators are consistent, but the former are efficient. If the individual effects are correlated with regressors, the fixed effect estimator is consistent while the random effect is not. Nevertheless the robustness of the fixed effects estimator can be useless if the variables do not vary much over time.

To facilitate cross country comparisons and to explore the role of the main socio-economic determinants in explaining the deprivation differentials across Europe, we adapt the well known decomposition of gender wage gap introduced by Blinder (1973) and Oaxaca (1973). From the estimates of the model represented in the equation 1) we can derive

$$\overline{\overline{D^c}} = \hat{\alpha}^c + \overline{\overline{\mathbf{x}^c}}\hat{\boldsymbol{\beta}}^c$$

where $\overline{\overline{D^c}}$ and $\overline{\overline{\mathbf{x}^c}}$ are respectively the average value of the predicted deprivation score and the covariates in the country *c*, and $\hat{\alpha}^c$ and $\hat{\boldsymbol{\beta}}^c$ are the estimated coefficients. After some algebraic manipulations we can write the deprivation gap between two countries, *A* and *B*, in the following form:

$$\underbrace{\overline{\overline{D^B}} - \overline{\overline{D^A}}}_{\text{GAP}} = \underbrace{(\hat{\alpha}^B - \hat{\alpha}^A)}_{\text{Constant}} + \underbrace{\overline{\overline{\mathbf{x}^A}}(\hat{\boldsymbol{\beta}}^B - \hat{\boldsymbol{\beta}}^A)}_{\text{Coefficients}} + \underbrace{(\overline{\overline{\mathbf{x}^B}} - \overline{\overline{\mathbf{x}^A}})\hat{\boldsymbol{\beta}}^A}_{\text{Endowments}} + \underbrace{(\overline{\overline{\mathbf{x}^B}} - \overline{\overline{\mathbf{x}^A}})(\hat{\boldsymbol{\beta}}^B - \hat{\boldsymbol{\beta}}^A)}_{\text{Interaction}} \qquad 6)$$

In the equation 6), the *interaction* term depends jointly on both differences between coefficients and endowments. The allocation of the *interaction* term depends on the choice of the reference country and we can rewrite the equation 6) as

$$\overline{\overline{D^B}} - \overline{\overline{D^A}} = (\overline{\overline{\mathbf{x}^B}} - \overline{\overline{\mathbf{x}^A}})\hat{\boldsymbol{\beta}}^* + \left[\overline{\overline{\mathbf{x}^B}}(\hat{\boldsymbol{\beta}}^B - \hat{\boldsymbol{\beta}}^*) + \overline{\overline{\mathbf{x}^A}}(\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}^A)\right] + (\hat{\alpha}^B - \hat{\alpha}^A) \qquad 7)$$

where $\hat{\boldsymbol{\beta}}^*$ is the vector of coefficients of the benchmark country. If we opt for the lower deprivation country (i.e. country *A*) as benchmark for the analysis of the deprivation differentials across countries (judging as reasonable a reduction of the deprivation of the high deprivation country), $\overline{\overline{D^B}} - \overline{\overline{D^A}}$ is positive and the equation 7) can be written as

$$\underbrace{\overline{\overline{D^B}} - \overline{\overline{D^A}}}_{\text{GAP}} = \underbrace{(\overline{\overline{\mathbf{x}^B}} - \overline{\overline{\mathbf{x}^A}})\hat{\boldsymbol{\beta}}^A}_{\text{Characteristics}} + \underbrace{\overline{\overline{\mathbf{x}^B}}(\hat{\boldsymbol{\beta}}^B - \hat{\boldsymbol{\beta}}^A)}_{\text{Returns}} + \underbrace{(\hat{\alpha}^B - \hat{\alpha}^A)}_{\text{Constant}} \qquad 8)$$

where the difference in deprivation attributable to the characteristics corresponds to the *endowments* and the difference attributable to the returns corresponds to the sum of *coefficients* term and *interaction* term.

The deprivation gap attributable to the characteristics is the value of the differences in characteristics evaluated by the lower deprivation country equation while the part of the gap attributable to the returns is the value of the difference between the high and low deprivation country's equations evaluated at the mean endowment of the high deprivation country (country *B*).

Both parts of the gap can be split into contributions of each regressor. Oaxaca and Ransom (1999) show that for the unexplained part the subdivision into separate contributions, in case of categorical or dummy variables, is sensitive to the choice of the reference group. Yun (2005) proposes a solution by utilizing normalized regressions and identifying both the constant and all the coefficients of categorical variables. In other words he considers the coefficients of constant and categorical

variables that reflect deviations from the grand mean rather than deviations from the reference category. It is an averaging approach based on the average estimates of constant and categorical variables as obtained by different regressions varying reference groups. With this method we can decompose the average differential in deprivation between each country and the benchmark one into differences in characteristics, returns and constant term. The last component reflects factors omitted by the model or any country specific element.

6. Empirical evidence

In order to explore the role that income but also other economic attainments have on the level of *Overall* deprivation an individual faces, we ran both random and fixed effects regressions for each country[3]. As seen in the previous section these estimators allow us to control for unobserved characteristics of individuals. Moreover, considering each country separately we can analyse the strength of the relationships in each country controlling for unobserved country differences. We present the results of random effects regressions in Table 4 and the results of fixed effects regressions in Table 5.

< INSERT TABLE 4 and 5 HERE >

The Hausman specification tests, comparing the fixed effects specification with the random effects specification, suggest a preference for the former in all cases. The statistics, reported at the bottom of the Table 5, indicate rejection of the null hypothesis of individual effects uncorrelated with regressors. However although we have a general preference for the fixed effects estimates given that the assumption on individual unobserved effects has been confirmed by the Hausman statistics, we discuss both the specifications. On the one hand the fixed effects estimates may reveal important effects of time varying variables due to an improvement or a reduction in the endowment of such variables. On the other hand the random effects estimates are more informative for variables that do not vary much over time.

[3] We also ran both random and fixed effects regressions considering as dependent variable either the *Basic* deprivation index or the *Current Life Style* deprivation index. We present the results in Table A3-A6 in Annex I. Even if most of the effects on deprivation index are stronger the main relationships between covariates do not differ substantially from those presented in the paper from the regressions of the *Overall* deprivation index.

The first important relationship to be analyzed is between deprivation and income: as discussed above we include in the regressions the current values of income and the values related to the two previous years. As expected deprivation and income are negative associated: in all countries the coefficients of random effects estimates are statistically significant and, with the exception of Belgium and the Netherlands, the impact of the first lag of income is stronger than of the current income. The same effect is confirmed by the fixed effects estimates even if the coefficients are not significant for Ireland and in part for Greece. Moreover, in most of the countries the coefficients of the second lag of income are still statistically significant: this confirms that generally changes in deprivation score do not reflect contemporary changes in income.

Concerning the employment status of the household head, the coefficient of being unemployed from the random effects specification is always statistically significant and positive. The impact of being inactive (mainly retired) is statistically significant and positive in all countries with the exception of Austria, Belgium and Italy but it is always smaller than that of being unemployed. The coefficients of the fixed effects model reveal that moving into and out of the labour market is as important as being in or out of it and becoming inactive has a significant and positive impact in Denmark, France, Greece, the Netherlands, Portugal and Finland. In the random effects specifications the effect of household head being unemployed in the previous year is statistically significant in most of the countries but generally smaller (except in Austria) than the effect of a current absence of job. It reveals a different timing in the impact of the lagged variables on deprivation score: the delayed effect of income is stronger than that of current but it is not true for the delayed effect of past unemployment.

The deprivation score and the proportion of people in working age employed in the household are negatively associated even if, in the random effects specification, statistically significant only in some countries. Nevertheless from the fixed effects model it is evident that in Denmark, Finland, France, Greece, Spain and Portugal if the proportion of person employed increases in the household the impact is statistically significant and even stronger.

A secondary high school qualification or more has an important, and negative, effect on the deprivation score considering both the educational level of the household head and the proportion of people with a high educational level within the household

(in all countries with the exception of Denmark and Finland where the coefficients from the random effects specifications are negative but not significant). The fixed effects coefficients are statistically significant only for few countries revealing the difficulties to capture the impact of the achievement of a new educational level.

As expected, the deprivation score is smaller if the household head and other members have a good health status. The effect of health status in the previous year is smaller in all countries with the exception of Finland. From the fixed effect model it is clear that an improvement in the health status is important in terms of deprivation reduction.

The housing tenure affects the deprivation score in all countries with a clear penalty of living (from the random effect specification) or moving (from the fixed effect specification) in rented houses rather than in an own house. The coefficients related to the presence of an outstanding mortgage do not have the same pattern in all countries revealing a different impact of this financial instrument: in the fixed effect specification they are negative in Belgium, Denmark, the Netherlands and Portugal. The coefficients associated to a free-rented house are always positive (except in the Netherlands) reflecting the generally poor nature of these houses.

Membership of clubs or associations has a statistically significant and negative impact on deprivation score (in the random specification) in all countries with the exception of Greece, Finland, France and the Netherlands.

From the random effects specification it emerges that receiving social assistance transfers has a significant and positive impact in seven countries and the effect is clearly bigger than that related to other social transfers. Nevertheless private transfers and unemployment benefits are significant in most of the countries. While social transfers are generally associated with higher deprivation, old-age benefits, ceteris paribus, have a negative effect on the deprivation score (significant in all countries with the exception of Greece, Spain and Portugal). Their effect is related to that of age: households with a larger proportion of old people face a lower deprivation score.

The effect of family composition is quite clear across countries: other things equal, the larger the number of adults, the higher the deprivation score the household faces with a bigger impact of the number both of adults and children in the Southern countries. The effect of being lone parent is significant and positive in all countries and also the fixed effect specifications reveal a statistically significant effect of becoming lone parent in Belgium, Denmark, France, Spain and the Netherlands.

Following the approach proposed by Yun (2005) and outlined above we can show the extent to which the predicted deprivation gap between each country and Denmark is attributable to differences into characteristics, returns and constant term, as shown in the equation (8). We start from the estimates of the fixed effects models and we select Denmark as benchmark because it has the lowest average predicted deprivation level but also one of the highest mean incomes (with the exception of Austria and Belgium), the highest percentage of household heads with a secondary high school level or more and a "positive" combination of employment status conditions of household heads and other members. In terms of housing conditions it shows a very high percentage of households living in a house with an outstanding mortgage.

Figure 6 and Table 6 show the absolute contribution of characteristics, returns and constant terms (i.e. the terms of the right hand side of the equation 8)) to the deprivation gap of each country (i.e. the left hand side of the equation 8)) with respect to Denmark.

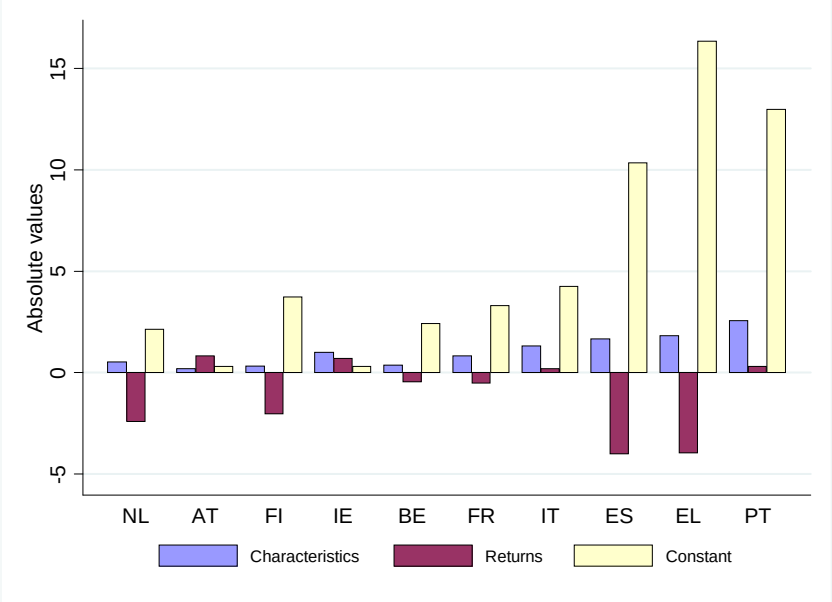

FIGURE 6: DECOMPOSITION OF DEPRIVATION GAP
(Notes. As for Table 1)

The contribution attributable to differences in characteristics is always positive: this means that part of the deprivation gap is due to generally lower averages of the socio-economic variables in each country than in Denmark. This component increases, in absolute value, as the total differential between two countries increases.

It explains the whole difference (or even a slightly larger difference reduced by the returns component) in the Netherlands and half the differential between Denmark and Ireland (49%) but also more than 20% of the difference between Denmark and France, Italy and Spain.

The component attributable to returns does not follow a clear pattern across countries: it is negative in six countries, the Netherlands, Finland, Belgium, France, Spain and Greece, where the aggregate effect of socio-economic determinants contributes to reducing the deprivation gap.

The component attributable to the constant term is positive in all countries and, as expected, it is bigger in the Southern countries. This component reflects the huge large differences between European countries, and in particular the specificity of Spain, Greece and Portugal, that cannot be explained by common socio-economic variables.

	NL	**AT**	**FI**	**IE**	**BE**	**FR**	**IT**	**ES**	**EL**	**PT**
Predicted Deprivation	5.65	6.75	7.42	7.42	7.76	9.02	11.20	13.40	19.62	21.27
GAP*	0.26	1.36	2.02	2.03	2.37	3.63	5.81	8.01	14.22	15.88
Decomposition of the GAP:										
Characteristics	0.52	0.20	0.32	1.00	0.39	0.82	1.32	1.66	1.83	2.59
Returns	-2.41	0.86	-2.03	0.71	-0.44	-0.51	0.22	-4.00	-3.96	0.30
Constant	2.15	0.31	3.73	0.31	2.42	3.32	4.27	10.35	16.36	12.99

* with respect to predicted deprivation in Denmark which is equal to 5.39

TABLE 6: DEPRIVATION GAP
(Notes. As for Table 1)

The following Table 7 shows the percentage contribution of the variables groups in explaining the deprivation gap. Conditional on the choice of the variables included in the fixed effects models, we can see the extent to which each group of factors, in terms of both characteristics and returns, is responsible for the gap. Focusing on the role played by the all income variables (i.e. including current and lags income values), they contribute in a percentage varying from around -400% in the Netherlands to around 245% in Ireland.

	NL	AT	FI	IE	BE	FR	IT	ES	EL	PT
Income	-407,44	225,53	14,50	246,41	105,12	11,69	30,82	-10,89	-15,79	6,61
Family composition and club membership	-37,85	-25,28	-14,39	22,26	-24,98	16,26	28,34	27,25	19,44	5,53
Education	-143,56	-45,88	-18,70	-6,54	-8,21	10,18	3,72	1,86	-0,91	3,43
Employment status	7,06	-13,19	-11,41	-29,59	28,11	-3,86	-2,24	4,84	-2,20	0,91
Health condition	165,34	-66,31	-15,81	-96,56	-6,40	-11,84	-27,37	-25,32	-15,12	-8,62
House tenure	462,63	62,92	23,77	33,27	23,69	22,64	6,67	0,16	0,88	3,02
Social Transfer	-772,75	-65,67	-56,24	-92,54	-120,72	-36,27	-13,23	-28,16	-1,72	7,42
Time	-9,81	6,88	10,80	7,80	1,25	-0,32	-0,15	1,08	0,43	-0,13
Constant	836,37	20,99	167,50	15,47	102,14	91,54	73,45	129,18	114,99	81,83
Total	100	100	100	100	100	100	100	100	100	100

TABLE 7: CONTRIBUTION OF VARIABLES GROUPS TO THE DEPRIVATION GAP
Values in percentage terms. (Notes. As for Table 1)

In order to explore the reasons for cross country deprivation gap we now provide more details of the contribution of income, educational level of household head, employment status and housing conditions. In the following graphs the values show the extent to which each variable, in terms of characteristics and returns, contributes to the deprivation gap.

In some countries, where a lower mean income than in Denmark contributes to increase the deprivation gap (Figure 7), the income return contributes to reduce this differential. In particular it is true in Portugal, Greece and Spain (especially due to the contribution of the first year lagged income), Finland and the Netherlands where an increase in income helps to close the gap. On the other hand in Belgium and Austria, where a higher mean income contributes to reduce the deprivation gap, the effect of an increase in income reduces deprivation less than in Denmark.

Considering the impact of characteristics and returns, the income variables contribute to reduce the gap in the Netherlands, Greece and Spain (see Table 6).

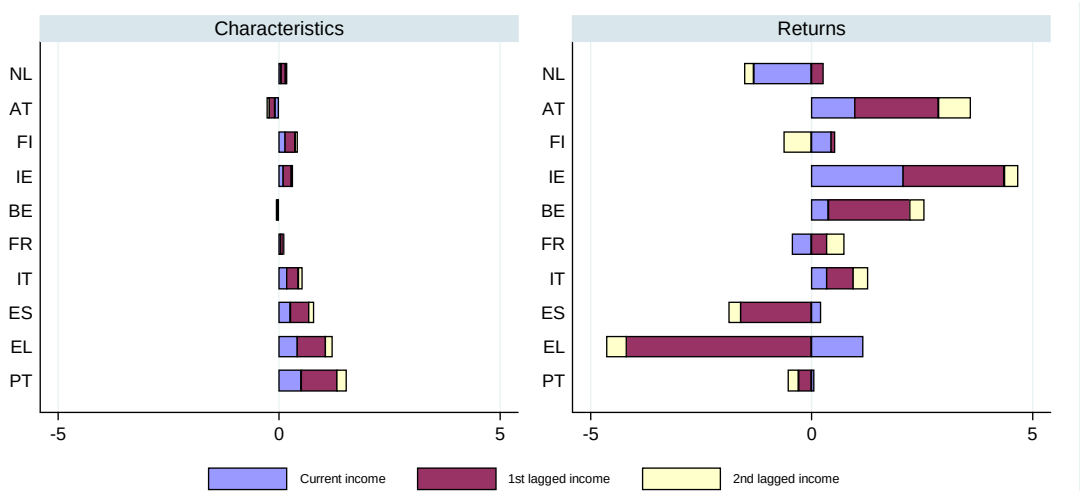

FIGURE 7: CONTRIBUTION OF INCOME VARIABLES TO THE DEPRIVATION GAP
(Notes. As for Table 1)

In all countries the employment status condition of the household head (in terms of being employed, unemployed or inactive) contributes to increase the deprivation gap (Figure 8). However the penalty for being inactive is lower in most of the countries: especially in Italy, Ireland and Austria. Being employed reduces the gap more in Greece, Ireland and Finland but it is less protective in Belgium, Spain and Austria. The country that shows the biggest penalty in deprivation terms of being unemployed is Ireland.

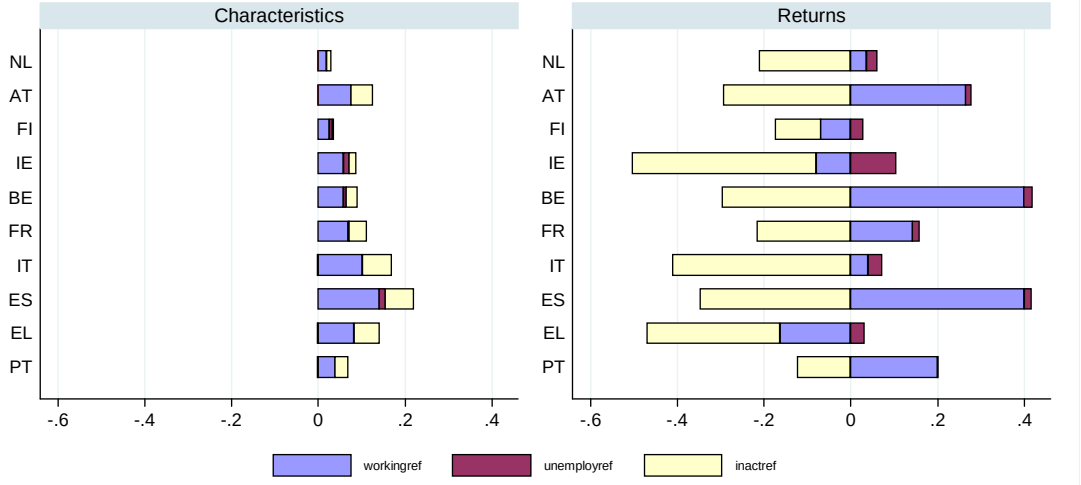

FIGURE 8: CONTRIBUTION OF EMPLOYMENT STATUS OF THE HOUSEHOLD HEAD TO THE DEPRIVATION GAP
(Notes. As for Table 1)

The employment condition of other household members explains a positive part of the deprivation gap (Figure 9). However in Finland, Portugal, Greece and

France the effect of a bigger participation of household members in the job market helps to close the gap with Denmark

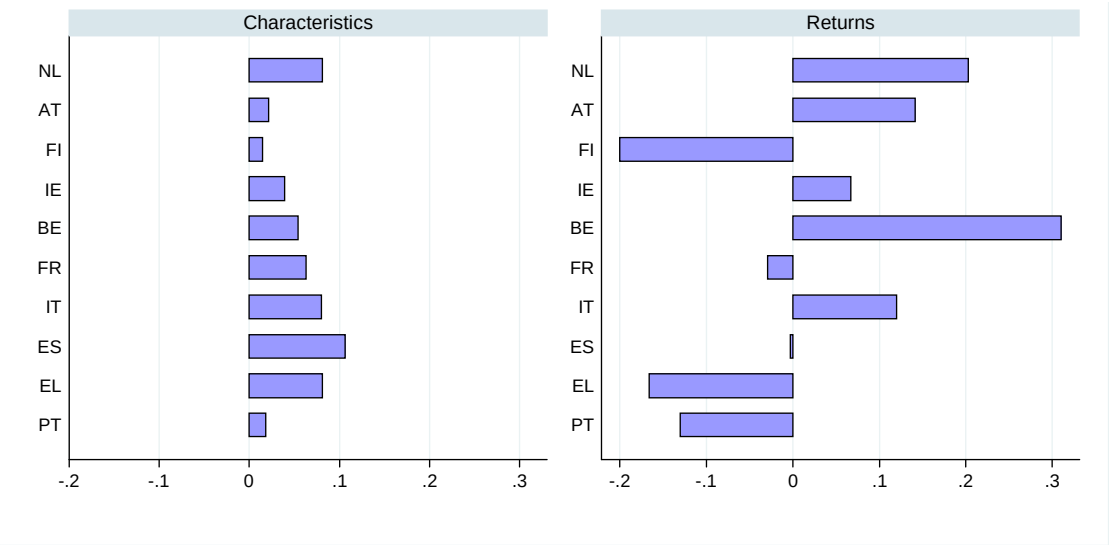

FIGURE 9: CONTRIBUTION OF EMPLOYMENT STATUS OF THE HOUSEHOLD MEMBERS TO THE DEPRIVATION GAP
(Notes. As for Table 1)

In all countries the house tenure status is important in order to explain the deprivation gap (Figure 10). Generally living in a house with an outstanding mortgage or provided rent-free contributes to increase the deprivation differential while living in an own house or in a rented house reduces it. In the Southern countries (Portugal, Greece, Spain and Italy) and in Finland the effect of owning an own house reduces the deprivation gap. Having an outstanding mortgage reduces the gap in Portugal and the penalty in Spain and Greece is lower than in other countries.

FIGURE 10: CONTRIBUTION OF HOUSING TENURE TO THE DEPRIVATION GAP
(Notes. As for Table 1)

Family related variables (in terms of number of adults, children, age of members and family type) explain the gap much more in terms of returns than in terms of characteristics (Figure 11). The effects are clearly differentiated in two blocs of countries: in the Southern countries, in France and Ireland family related variables increase the deprivation gap. In the other countries family related variables contribute to reduce the gap especially in Belgium and Finand.

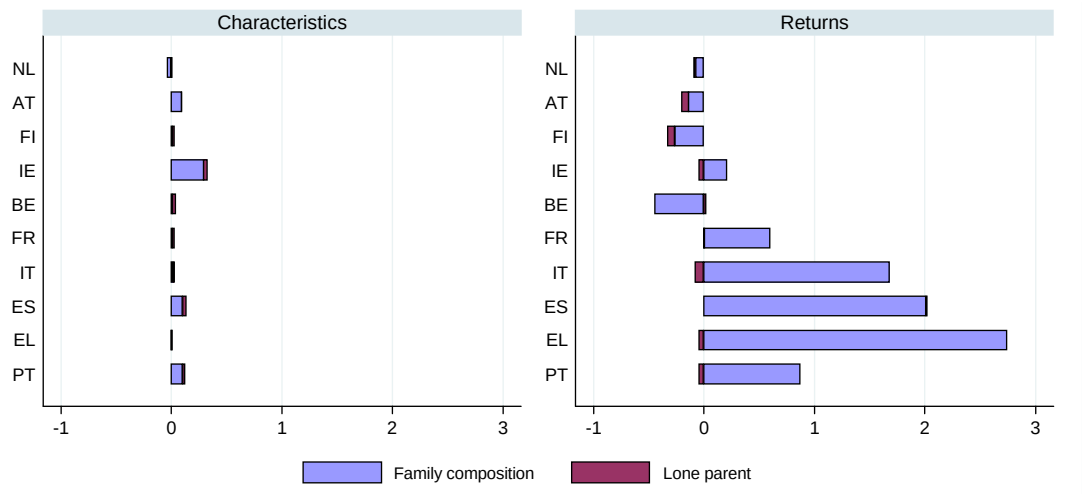

FIGURE 11: CONTRIBUTION OF FAMILY VARIABLES TO THE DEPRIVATION GAP
(Notes. As for Table 1)

As already noted, the constant term plays an important role in explaining the deprivation gap, including any factors not captured by the model (Figure 12). It can be seen as a measure of the unobserved differences between European countries: it is relevant in explaining the deprivation gap especially in Greece, Portugal and Spain. Austria and Ireland show the smallest constant term: the deprivation gap can be reduced substantially by acting on the economic factors captured by the model.

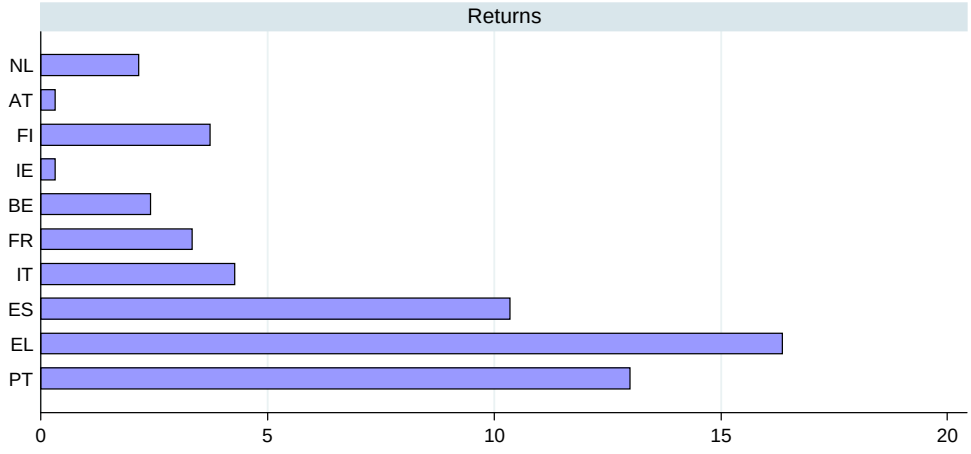

FIGURE 12: CONTRIBUTION OF THE CONSTANT TERM TO THE DEPRIVATION GAP
(Notes. As for Table 1)

7. Summary and conclusion

The results of the longitudinal analyses conducted using the ECHP survey show that in all European countries, measures of income poverty and deprivation summarize dissimilar phenomena and identify different subjects as being at risk of low living standards. They show the relative inability of income to explain the multidimensional nature of poverty. We started looking at some raw relationships between income and deprivation.

Average deprivation levels are consistent with the poverty rates with the exception of Ireland. Moreover they follow the traditional welfare regimes classification with higher levels in the South. In all countries the deprivation level decreases over time even considering the weighting within each country and each year. As seen in the Section 4, it may depend on a number of reasons: the fixed set of the indicators used in the construction of the deprivation index, the durable nature and lower prices over time of some of them. This cannot be interpreted as a success in eradicating deprivation.

There is mismatch between income poverty and deprivation everywhere even if in the income poorest countries it is less evident. This mismatch confirms the limitations of income poverty measures in identifying individuals excluded by a minimum level of living standards as measured by the selected indicators. This is in part due to the different timing of the phenomena captured by income and deprivation measures.

Focusing on the bottom of the income distribution, in most of the countries the poorest individuals are not the worst-off in terms of deprivation. It can be due to lower expectations and requirements of the poorest in terms of social life and durables, changes in income not reflected in deprivation or measurement errors.

To sum up, these first raw relationships show the relative inability of current income to explain the multidimensional nature of poverty and the need for complementary indicators. From the estimates of fixed and random effects models we can quantify the role of the socio-economics determinants, other than current and lagged income, in explaining deprivation.

First, changes in income and deprivation do not strictly coincide and lagged income has a larger effect than current income. This supports policies in favour of

individuals in long term poverty status rather than those suffer from short fluctuation of their own income in all countries with the exception of Austria, Belgium, Denmark and the Netherlands. In Ireland the Fixed Effects coefficients of income variables are not statistically significant because of the limited variability of income across waves.

Second, moving into and out of the labour market is important both for the household head and other members and employment status also has a significant delayed effect, although it is weaker than that of income. Also controlling for the fact that individuals with a job have higher income, employment is a protection against low living standards and it confirms the potential validity of in-work policies.

Third, home ownership (with or without an outstanding mortgage) has an important impact on deprivation, capturing the effects of different current housing costs and asset formation: it should encourage any action to increment the capacity of individuals to own their home by fiscal and financial policies to have access to mortgage.

Moreover, a higher qualification (secondary school or university degree) and health policies play an important role, other things being equal, in reducing the deprivation score.

The effects of receiving social transfers, after allowing for a given income, show that income sources, and not only the amount, make a difference.

Moreover the inverse relationship between age and deprivation incremented is also reinforced by the effect of receiving old-age benefits: this can be attributed to a number of specific behaviours of old people. They may have adopted a thrifty life style, accumulated durable goods and built up assets during their life in order to prevent lack of resources in the old age and they seem to be less vulnerable than other categories. On the contrary, lone parents should always be considered as a primary focus of concern.

The decomposition of the deprivation gaps between countries show which socio-economic factors, other than income, explain the deprivation differentials across Europe. Denmark is the benchmark country with the lowest average predicted deprivation level but also the most favourable economic indicators: it implies that part of the deprivation gap is attributable to worse economic situations than in Denmark. The main differences across countries are in part attributable to mean characteristics and returns of each socio-economic determinant but also to a fixed country effect not captured by the model. Nevertheless the same variables have much more

differentiated effects across Europe highlighting, in some countries, space for the implementation of new policies.

On the one hand the Southern countries show some important peculiarities. Increases in income (except in Italy), achievement of higher education and home ownership have a stronger effect on reducing the deprivation gap than in other countries. In Spain, Portugal and Greece participation in the job market of household members helps to reduce the differential as well. On the other hand, family composition has a worse effect on deprivation than in other countries. However, these countries also show the biggest fixed country effect not captured by the model: it explains from 25% of the gap in Italy to 45% in Portugal confirming the heterogeneity of these countries from the rest of Europe.

On the other hand, Austria and Ireland, two countries with a low deprivation level, show a very small fixed country effect. In other words, they could potentially close the deprivation gap focusing on the socio-economic factors captured by our model. In these countries, an increase in income and the effect of home ownership, with or without an outstanding mortgage, are less effective in reducing the gap. Concerning the employment status of the household head, Ireland shows also the biggest penalty of being unemployed. Moreover Ireland shares the same effects of family composition with the Southern countries.

From a policy point of view, three main points emerge from these results. First they imply that, in order to fight social exclusion, income policies should be accompanied by more comprehensive policies including employment, education, family, housing and health programmes. Second, individuals in long term poverty status rather than those suffer from short fluctuation of their own income should be considered as a primary target of concern. Third, the different phenomena captured by income poverty and deprivation measures should be taken into account in the definition of the eligibility criteria of the public policies.

In order to evaluate the ability of the different welfare regimes to prevent and deal with deprivation, the dynamic of deprivation in terms of short and long term effects of the socio-economic determinants on it should be investigated. Such a dynamic analysis should consider the persistence of deprivation over time and the impact of the determinants given the initial deprivation conditions.

References

Adkin, N. (1994) Characteristics of the bottom 20 per cent of the income distribution in J. Church (Ed.) *Social Trends 24*, London: HMSO Central Statistical Office.

Atkinson, A. B. (1975) *The Economics of Inequality*. Oxford: Oxford University Press.

Atkinson, A. B. (2003) Multidimensional deprivation: contrasting social welfare and counting approaches. *Journal of Economic Inequality* 1: 51-65.

Atkinson, A. B., Cantillon, B., Marlier, E. and Nolan, C. (2002) *Social Indicators. The EU and Social Inclusion*. Oxford: Oxford University Press.

Berthoud, R. (2004) *Patterns of poverty across Europe*. Bristol: Policy Press.

Berthoud, R., Bryan, M. and Bardasi, E. (2004) *The relationship between income and material deprivation over time*. London: DWP, RR 219.

Blinder, A. (1973) Wage discrimination: reduced form and structural estimates. *Journal of Human Resources* 8: 436-55.

Bradbury, B., Jenkins, S. P. and Micklewright, J. (2001) Conceptual and measurement issues in Bradbury, B., Jenkins, S. P. and Micklewright, J. (Eds.), *The Dynamics of Child Poverty in Industrialized Countries*. Cambridge: Cambridge University Press.

Callan, T., Nolan, B. and Whelan, C.T. (1993) Resources, deprivation and the measurement of poverty. *Journal of Social Policy* 22(2): 141-72.

Coombes, M., Raybould, S., Wong, C. and Openshaw, S. (1995) Towards an index of deprivation: a review of alternative approaches, in *1991 Deprivation Index: a review of approaches and a matrix of results*. London: HMSO Department of the Environment.

Department for Work and Pensions (2003) *Measuring child poverty*. London: DWP.

Desai, M. and Shah, A. (1988) An econometric approach to the measurement of poverty. *Oxford Economic Papers* 40(3): 505-22.

Donnison, D. (1988) Defining and Measuring Poverty. A Reply to Stein Ringen, *Journal of Social Policy* n. 17(3): 367-74.

Eurostat (2002), *European Social Statistics: Income, Poverty and Social Exclusion*. THEME 3, Population and Social Conditions. Luxembourg: Eurostat.

Gordon, D. and Pantazis, C., Eds. (1997) *Breadline Britain in the 1990s*. Aldershot: Ashgate.

Gordon, D. and Townsend, P. (1990) Measuring the poverty line. *Radical Statistics* 47: 5-12.

Gordon, D., Adeleman, L., Ashworth, K., Bradshaw, J, Levitas, R., Middleton, S., Pantazis, C., Patsios, D., Payne, S., Townsend, P. and Williams, J. (2000) *Poverty and Social Exclusion in Britain*. York: Joseph Rowntree Foundation.

Hallerod, B. (1995) The truly poor: direct and indirect consensual measurement of poverty in Sweden. *European Journal of Social Policy* 5(2): 111-29.

Layte, R., Maitre, B., Nolan, B. and Whelan, C. T. (2001a) Persistent and consistent poverty in the 1994 and 1995 waves of the European Community Household Panel Survey. *Review of Income and Wealth* 47(4): 427-49.

Layte, R., Maitre, B. Nolan, B. and Whelan, C. T. (2001b) Explaining levels of deprivation in the European Union, *Acta Sociologica* 44(2): 105-22.

Mack, J. and Lansley, S. (1985) *Poor Britain*. London: Allen and Unwin.

Mayer, S. (1993) Living conditions among the poor in four rich countries. *Journal of Population Economics* 6: 261-86.

McKay, S. (2004) Poverty or preference: what do 'consensual deprivation indicators' really mean? *Fiscal Studies* 25(2): 201-23.

McKay, S. and Collard, S. (2003) Developing deprivation questions for the Family Resources Survey. DWP WP 13. URL: http://www.dwp.gov.uk/asd/asd5/WP13.pdf

Muffels, R. (1993) Deprivation standards and style of living indices, in J. Berghman and B. Cantillon (Eds.) *The European Face of Social Security*. Avebury: Aldershot.

Muffels, R. and Fouarge, D. (2004), The role of European welfare states in explaining resources deprivation. *Social Indicators Research* 68: 299-330.

National Anti-Poverty Strategy (1997), *Sharing in Progress: National Anti-Poverty Strategy*. Dublin Dublin: Government Publications Office.

Nolan, B. and Whelan, C. (1996) *Resources, Deprivation and Poverty*. Oxford: Clarendon Press.

Nolan, B., Maitre, B. and Watson, D. (2001) Child income poverty and deprivation dynamics in Ireland in Bradbury B., Jenkins S. P. and Micklewright J. (Eds), *The Dynamics of Child Poverty in Industrialized Countries*. Cambridge: Cambridge University Press.

Oaxaca, R. L. (1973) Male female wage differentials in urban labour markets. *International Economic Review* 14(3): 693-709.

Perry, B. (2002) The mismatch between income measures and direct outcome measures of poverty. *Social Policy Journal of New Zealand* 19: 101-27.

Rendtel, U., Nordberg, L., Jantti, M., Hanish, J., and Basic, E. (2004) Report on quality of income data. CHINTEX Working Paper 21.

Ringen, S. (1987) *The possibility of politics. A study in the political economy of the welfare state*. Oxford: Clarendon Press.

Ringen, S. (1988) Direct and indirect measures of poverty. *Journal of Social Policy* 17(3): 351-65.

Sen, A. K. (1997) *On Economic Inequality* (3rd edition). Oxford: Oxford University Press.

Townsend, P. (1979) *Poverty in the United Kingdom*. Harmondsworth: Penguin.

Townsend, P. (1993) *The international analysis of poverty*. Harvester: Wheatsheaf.

Vegeris, S. and McKay, S. (2002) Low/moderate income families in Britain: changes in Living Standards 1999-2000. London: Department for Work and Pension, RR 164.

Vegeris, S. and Perry J. (2003) Families and children 2001: living standards and the children. London: Department for Work and Pension, RR 190.

Whelan, C. T. and Maitre, B. (2005) Comparing Poverty and Deprivation Dynamics: Issues of Reliability and Validity. EPAG WP 53/2005.

Whelan, C. T., Layte, R. and Maitre, B. (2002a) Multiple deprivation and persistent poverty in the European Union. *Journal of European Social Policy* 12(2): 91-105.

Whelan, C. T., Layte, R. and Maitre, B. (2002b) Persistent deprivation in the European Union. *Journal of Applied Social Science Studies* 122: 31-54.

Whelan, C. T., Layte, R. and Maitre, B. (2003) Persistent income poverty and deprivation in the European Union: an analysis of the first three waves of the European Community Household Panel. *Journal of Social Policy* 32(1): 1-18.

Whelan, C. T., Layte, R. and Maitre, B. (2004a) Understanding the mismatch between income poverty and deprivation: a dynamic comparative analysis. *European Sociological Review* 20(4): 287-302.

Whelan, C. T., Layte, R. and Maitre, B. (2004b) Deprivation and social exclusion, in Berthoud, R. and Iacovou, M. (Eds.) *Social Europe. Living standards and welfare states*. Edward Elgar.

Whelan, C. T., Layte, R., Maitre, B. and Nolan, B. (2001) Income, Deprivation and Economic Strain. An analysis of the European Community Household Panel. *European Sociological Review* 17(4): 357-72.

Yun, M.-S. (2005) A Simple Solution to the Identification Problem in Detailed Wage Decompositions. *Economic Inquiry* 43: 766-72. Erratum in *Economic Inquiry* (2006) 44: 198.

Annex I

Questions in the ECHP survey:

BASIC DIMENSION
Can the household afford…

… keeping its home adequately **warm**?
… paying for a week's annual **holiday** away from home?
… replacing any worn-out **furniture**?
… buying **new**, rather than second-hand, **clothes**?
… eating **meat, chicken or fish (good diet)** every second day?
… having **friends or family** for a drink or meal at least once month?
… paying scheduled rent/mortgage and utility bills of the **house**?

SECONDARY DIMENSION
Affordability of…

… **car**
… **tv**
… **video recorder**
… **micro wave**
… **dishwasher**
… **telephone**

HOUSING FACILITIES DIMENSION
Does the dwelling have…

… **bath or shower**?
… indoor flushing **toilet**?
… **hot** running **water**?

HOUSING DETERIORATION DIMENSION
Does the accommodation have…

… leaky **roof**?
… **damp** walls, floors, foundations…?
… **rot** in window frames or floors?

ENVIRONMENT DIMENSION
Does the accommodation have…

… **noise** from neighbours?
… shortage of **space**?
Is there any **pollution, grime**, or other environmental problem…?
Is the accommodation **too dark / not enough light**?
Is there **crime or vandalism** in the area?

	1994	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
AT	---	6764	6570	6227	5896	5521	5318
BE	6346	6141	5796	5409	5083	4792	4358
DK	5229	4820	4370	4061	3823	3739	3744
EL	11883	11254	10627	9698	8970	8999	9090
ES	15926	14902	14035	13123	12433	11920	11470
FI	---	---	7802	7178	6757	5373	5420
FR	12919	12422	11643	11090	10553	10002	9740
IE	8895	7807	7132	6595	5712	4708	4217
IT	16648	16801	15893	14991	14707	14060	12906
NL	9083	9086	9102	8755	8515	8460	8364
PT	11095	11220	11110	10922	10890	10768	10689

TABLE A1: SAMPLES SIZES
(Notes. As for Table 1)

	1994		*1995*		*1996*		*1997*		*1998*		*1999*		*2000*	
	mean	*rank*	*mean*	*rank*	*mean*	*rank*	*mean*	*rank*	*mean*	*rank*	*mean*	*rank*	*mean*	*rank*
AT	---	---	7.89	3	7.50	3	7.06	3	6.48	3	6.38	4	6.12	4
BE	8.87	3	9.04	5	8.19	4	7.94	5	7.49	5	7.11	5	6.49	5
DK	6.85	2	5.82	1	5.89	1	5.34	1	5.37	1	5.29	1	5.07	1
EL	---	---	21.52	9	20.49	10	19.88	10	18.53	10	18.56	10	17.20	10
ES	17.31	7	15.39	8	14.98	9	14.26	9	12.47	9	11.63	9	10.13	8
FI	---	---	---	---	8.78	6	8.08	6	7.52	6	7.58	6	7.05	6
FR	10.98	5	9.96	6	9.75	7	9.11	7	9.22	7	8.38	7	8.05	7
IE	10.14	4	8.80	4	8.72	5	7.79	4	6.70	4	6.09	3	5.13	2
IT	12.32	6	11.82	7	11.69	8	11.69	8	11.44	8	10.81	8	10.64	9
NL	6.63	1	6.25	2	6.35	2	5.88	2	5.38	2	5.32	2	5.62	3
PT	24.57	8	23.39	10	22.36	11	22.00	11	21.07	11	19.80	11	18.23	11

TABLE A2: OVERALL DEPRIVATION SCORE AND RANKING
(Notes. As for Table 1)

	1994	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
AT	---	30.18	28.92	27.21	27.96	26.84	23.16
BE	32.57	33.83	34.99	33.55	29.81	30.59	31.60
DK	17.94	20.98	18.01	21.39	20.54	20.84	24.38
EL	---	37.42	40.41	36.56	36.79	38.12	38.21
ES	38.62	38.02	38.28	36.67	37.70	33.53	34.07
FI	---	---	21.01	27.36	28.27	28.46	30.03
FR	40.00	32.69	37.51	38.21	39.28	37.26	36.71
IE	33.88	34.71	39.39	36.63	35.94	39.44	34.03
IT	39.68	42.69	37.58	40.72	42.12	39.10	39.36
NL	31.55	35.49	35.81	32.86	32.41	27.14	28.70
PT	43.61	41.04	39.88	39.05	37.82	37.83	41.22

TABLE A3: OVERLAP BETWEEN INCOME POVERTY AND DEPRIVATION
Values in percentage terms. (Notes. As for Table 1)

	AT	BE	DK	EL	ES	FI	FR	IE	IT	NL	PT
Income	-2.869***	-3.738***	-1.744***	-4.434***	-4.098***	-3.006***	-4.426***	-1.820***	-4.210***	-3.254***	-3.474***
Last year's income	-3.078***	-2.646***	-2.721***	-10.795***	-6.451***	-4.941***	-5.026***	-2.888***	-5.587***	-3.372***	-4.459***
Two years' ago income	-0.982***	-1.448***	-0.364	-3.456***	-1.576***	-1.153**	-0.880***	-1.559***	-2.178***	-0.921***	-1.817***
Higher education hh head	-3.296***	-1.513***	-1.113**	-7.945***	-3.434***	-1.889***	-2.607***	-2.139***	-4.007***	-2.513***	-4.941***
Higher education ratio	-1.689***	-1.303**	-0.222	-4.805***	-4.087***	-1.764**	-0.841**	-1.981***	-2.610***	-1.170***	-4.351***
Unemployed hh head	4.642***	5.325***	5.125***	8.266***	3.536***	5.565***	5.108***	6.335***	8.635***	5.990***	1.951**
Inactive hh head	0.906	1.721**	3.338***	3.136***	1.770***	1.986***	0.398	2.384***	1.313***	2.316***	2.929***
Employment ratio	-0.397	0.014	-0.433	-2.761***	-0.088	-1.278**	-1.077***	-1.043**	-2.017***	-0.445	-1.087**
Past-unemployed hh head	2.446**	2.814**	1.941***	2.447*	2.352***	2.484***	3.355***	3.134***	2.493***	2.418***	1.203
Past-employment ratio	-0.626	0.031	-0.199	1.218*	0.938**	0.563	-0.074	0.339	-0.243	0.406	0.889**
Good Health hh head	-3.191***	-4.536***	-1.605**	-4.698***	-3.227***	-2.286***	-3.267***	-3.378***	-3.907***	-3.253***	-2.374***
Health ratio	-1.107	-0.268	-0.455	-3.888***	-3.462***	-1.728***	-0.668	-0.754	-3.016***	-0.944**	-1.969***
Past good Health hh head	-3.062***	-2.933***	-1.889**	-2.187***	-2.013***	-3.656***	-2.149***	-1.077	-0.912**	-1.211*	-0.804**
Past-health ratio	-0.655	-0.286	-0.486	-1.725**	-2.073***	-0.189	0.117	-0.841	-0.615	-0.041	-0.358
Club ratio	-3.010***	-1.675***	-0.978***	-1.992**	-1.700***	-0.824*	-0.905***	-1.287***	-2.103***	-0.427*	-3.109***
Mortgage	0.371	1.545***	1.437**	3.572***	2.873***	4.770***	1.830***	1.274***	3.450***	2.277***	1.824***
Tenant	1.831***	4.504***	2.992***	8.748***	5.785***	6.383***	2.976***	8.603***	4.898***	4.609***	3.379***
House free	0.748	3.052**	-0.689	3.269***	2.893***	1.143	-0.046	0.764	1.931***	-1.046	4.841***
Private transfers	1.263*	1.845***	1.213***	2.678***	3.364***	1.479*	0.408	1.009	2.706***	-0.467	1.959*
Unemployment benefits	2.587***	2.125***	0.353	5.607***	2.932***	1.804***	2.065***	1.496***	1.994***	1.503***	-0.015
Old-age/survivors benefits	-1.817***	-1.804**	-0.895	-0.510	-0.210	-1.100	-1.760***	-1.705***	-1.119**	-0.075	-0.759
Family-related allowances	0.402	-0.083	0.288	2.725***	1.158	2.289***	0.475	0.337	0.698	0.080	1.059***
Sickness/invalidity benefits	0.227	1.407**	-0.193	2.122*	2.149***	1.523**	1.319***	1.136	0.087	1.792***	-0.046
Social assistance	0.258	10.592***	4.348***	0.487	2.587	8.956***	5.089***	2.932***	6.427***	13.073***	2.434**
Housing allowance	1.988**	1.974	2.311***	4.297	6.088***	1.612*	4.851***	4.889*	-4.089***	2.897***	-0.790
Single family	1.072	2.291**	1.930**	-4.130***	-2.312***	-1.307	2.066***	-3.057***	-1.746**	0.164	2.376***
Couple with kids	1.099	1.904***	0.636	2.532***	1.660***	2.230***	1.553***	1.009*	1.031*	1.141***	-0.004
Other family	3.170***	3.514*	1.952	2.856**	2.826***	4.622**	1.824**	1.566*	3.075***	2.909	4.493***
Lone parents	4.407***	7.951***	7.199***	7.478***	4.561***	5.967***	7.693***	5.930***	3.209***	6.169***	4.617***
Number of adults	2.276***	1.139***	1.421***	2.884***	2.476***	1.432***	2.423***	1.178***	3.149***	1.382***	2.761***
Number of children squared	0.600***	0.363***	0.370***	0.795***	0.714***	0.369***	0.273**	0.537***	0.699***	0.198***	0.924***
Age ratio	0.406	-0.580	-3.400***	1.104	-1.176*	-3.476***	-0.503	-3.425***	0.151	-0.860	0.630
Year 1996		2.519***	0.728**	4.667***	0.629*		2.840***	1.960***	-0.182	-0.007	-2.001***
Year 1997	-0.376	1.379***	0.663**	9.635***	1.276***		2.925***	1.896***	-0.189	0.058	-2.050***
Year 1998	-0.498	1.142***	0.008	2.755***	0.394	2.186***	1.600***	0.763**	-0.983***	0.008	-1.435***
Year 1999	-0.624*	0.196	0.339	-1.751***	-0.222	0.629*	1.169***	0.372	-0.444	-0.929***	-1.358***
Year 2000	-0.896***	0.311	0.356	-0.467	0.258	0.100	-0.039	0.423	-0.244	-1.016***	-1.267***
Constant	37.347***	36.045***	20.317***	88.941***	52.922***	39.594***	41.085***	28.424***	53.404***	29.215***	47.606***
Number of observation	27403	27826	22170	55022	70638	19228	59185	32219	82063	43967	60805
Number of groups	7407	6753	5749	12807	17280	7278	14176	8656	19155	11127	13526
Wald test	715.948	972.984	689.502	5918.070	5381.336	1329.730	2687.875	1373.008	2999.538	1461.402	3359.521
p value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2 within	0.008	0.014	0.028	0.071	0.039	0.045	0.036	0.060	0.022	0.033	0.024
R^2 between	0.278	0.346	0.247	0.473	0.474	0.299	0.410	0.418	0.403	0.367	0.431
R^2 overall	0.201	0.228	0.175	0.342	0.328	0.247	0.315	0.341	0.294	0.288	0.324

TABLE A4: RESULTS FROM RANDOM EFFECTS MODEL – BASIC DEPRIVATION INDEX
* p<0.10, ** p<0.05, *** p<0.01 from robust standard errors, adjusted for clustering by household
(Notes. As for Table 1)

	AT	BE	DK	EL	ES	FI	FR	IE	IT	NL	PT
Income	-1.236**	-1.697***	-1.173***	-1.467***	-2.093***	-1.739***	-1.989***	-0.784*	-1.194***	-1.883***	-1.787***
Last year's income	-0.709	-1.248**	-1.782***	-7.892***	-3.915***	-2.170***	-2.323***	-1.460***	-3.139***	-2.124***	-2.821***
Two years' ago income	0.163	-0.617	0.019	-1.011**	-0.401*	-0.528	-0.350*	-0.312	-0.599**	-0.597**	-0.751***
Higher education hh head	-1.545	1.092	-1.345*	-4.584***	-1.103	-1.808	-0.645	-0.254	-1.247	-0.743	-1.113
Higher education ratio	-1.468	-0.172	1.136*	0.931	-0.828	-2.264**	1.063*	-0.328	0.260	-1.455**	1.124
Unemployed hh head	2.561	3.947***	4.466***	6.896***	2.740***	5.129***	4.047***	5.707***	6.980***	5.469***	1.637**
Inactive hh head	0.687	1.414	3.425***	2.395**	0.442	3.667***	0.879	1.871***	1.640***	2.005***	2.447***
Employment ratio	-0.834	0.252	-0.462	-4.981***	-1.250**	-1.434**	-1.344***	-1.255**	-1.568***	-0.846**	-1.974***
Past-unemployed hh head	0.834	1.324	0.668	1.252	1.690***	1.040	1.690**	1.989**	1.188	1.457*	1.201
Past-employment ratio	-0.975*	0.255	-0.156	-0.407	-0.156	0.139	-0.218	-0.183	-0.016	0.036	0.278
Good Health hh head	-1.949**	-1.950**	-0.232	-2.571***	-2.001***	-1.733**	-1.567***	-1.583	-2.494***	-1.603**	-1.752***
Health ratio	-0.930	-0.327	0.264	-2.908***	-2.655***	-1.644**	-0.166	-0.800	-2.535***	-0.557	-1.915***
Past good Health hh head	-2.000***	-0.743	-0.894	0.170	-0.691	-2.837***	-0.478	0.678	0.374	0.326	-0.237
Past-health ratio	-0.260	-0.044	-0.300	-0.399	-1.054**	-0.317	0.477	-0.451	-0.128	0.776*	-0.238
Club ratio	-1.171**	-0.542	-0.283	-0.681	-0.470	-0.166	-0.034	-0.502	-0.578	0.543**	-1.200**
Mortgage	0.433	-0.119	0.877	3.331***	1.894***	2.075***	0.776**	-0.113	3.993***	0.103	0.445
Tenant	-0.422	-1.324	1.322	3.229**	3.763***	2.107*	-0.051	2.335	2.483***	0.157	0.158
House free	0.049	0.585	-0.987	3.101**	1.721**	2.892	-1.155	-0.254	1.767**	-2.974**	2.250***
Private transfers	0.850	0.925	0.792	1.959*	2.776***	1.518*	1.051**	1.091	0.918	1.076	1.900
Unemployment benefits	0.839	0.352	-0.181	3.964***	2.028***	0.674	1.424***	0.382	0.874	0.843	-0.486
Old-age/survivors benefits	-0.451	-1.317	0.198	-0.634	-0.191	-0.030	-1.366**	-0.746	-0.580	-0.742	0.022
Family-related allowances	0.055	-0.597	-0.328	0.365	-0.926	0.250	0.146	-0.205	0.341	-0.350	0.862*
Sickness/invalidity benefits	0.856	0.087	-1.431*	0.395	0.938	0.988	0.231	-0.287	-0.776	0.510	-0.609
Social assistance	0.259	5.523**	-1.110	-0.766	0.940	3.443**	2.069	0.715	1.245	8.139***	-0.447
Housing allowance	0.566	0.263	0.739	4.115	5.005**	1.241	2.396***	0.878	-4.775***	0.310	-4.013
Single family	-0.403	3.728**	5.457***	-0.817	1.522	0.493	3.913***	-1.116	1.262	-0.908	0.710
Couple with kids	-0.050	1.037	-0.116	0.456	2.310***	0.508	0.852*	0.895	-0.108	0.963**	-0.663
Other family	0.784	-0.158	3.187	1.648	3.720***	7.729***	1.044	2.711*	3.126**	2.323	-0.168
Lone parents	2.254	6.303***	8.379***	1.838	4.399***	2.552	5.811***	3.869***	-0.386	3.843***	0.837
Number of adults	0.105	0.294	1.186***	2.131***	1.216***	0.851	0.808**	0.338	1.396***	0.403	0.854***
Number of children squared	-0.124	0.111	0.288***	0.799***	0.416***	0.299*	0.025	0.462***	0.475***	-0.101	0.346***
Age ratio	0.995	1.754	0.171	-1.320	-0.375	-2.645	0.993	-0.519	1.138	-2.654***	2.139**
Year 1996		3.494***	1.245***	5.264***	1.932***		3.538***	3.806***	1.436***	0.253	-0.162
Year 1997	0.066	2.220***	1.147***	10.292***	2.624***		3.540***	3.520***	1.311***	0.263	-0.418
Year 1998	0.047	1.870***	0.369	3.503***	1.595***	3.194***	2.187***	2.129***	0.391	0.117	0.041
Year 1999	-0.195	0.614	0.539*	-1.403***	0.543*	1.435***	1.688***	1.152***	0.310	-0.797***	-0.522*
Year 2000	-0.658**	0.463	0.339	-0.416	0.619**	0.477	0.321	0.823***	0.092	-0.968***	-0.822***
Constant	23.657***	18.885***	10.722***	63.110***	34.935***	27.886***	22.466***	14.794***	31.704***	21.157***	41.378***
Number of observation	27403	27826	22170	55022	70638	19228	59185	32219	82063	43967	60805
Number of groups	7407	6753	5749	12807	17280	7278	14176	8656	19155	11127	13526
F test	2.038	4.756	5.9	26.559	17.375	7.367	17.301	9.756	10.354	8.432	9.155
p value	0	0	0	0	0	0	0	0	0	0	0
R^2 within	0.012	0.021	0.038	0.079	0.043	0.054	0.042	0.070	0.027	0.039	0.030
R^2 between	0.140	0.215	0.119	0.435	0.445	0.210	0.350	0.343	0.347	0.304	0.313
R^2 overall	0.099	0.140	0.098	0.301	0.301	0.177	0.262	0.281	0.248	0.236	0.231

TABLE A5: RESULTS FROM FIXED EFFECTS MODEL – BASIC DEPRIVATION INDEX
* p<0.10, ** p<0.05, *** p<0.01 from robust standard errors, adjusted for clustering by household
(Notes. As for Table 1)

	AT	BE	DK	EL	ES	FI	FR	IE	IT	NL	PT
Income	-1.959***	-2.391***	-1.427***	-2.734***	-3.317***	-1.768***	-3.088***	-1.327***	-2.870***	-2.338***	-3.138***
Last year's income	-2.017***	-1.947***	-2.576***	-6.752***	-5.329***	-3.308***	-3.595***	-2.141***	-3.470***	-2.413***	-3.850***
Two years' ago income	-0.781***	-1.047***	-0.620**	-2.390***	-1.613***	-0.884***	-0.724***	-1.595***	-1.407***	-0.776***	-1.842***
Higher education hh head	-2.283***	-1.166***	-0.677**	-4.839***	-3.125***	-0.889**	-1.831***	-2.003***	-2.768***	-1.495***	-5.087***
Higher education ratio	-1.830***	-1.003***	0.093	-4.139***	-3.950***	-0.739*	-0.624**	-2.267***	-1.656***	-0.676***	-4.396***
Unemployed hh head	3.533***	3.968***	3.374***	5.378***	3.079***	3.773***	3.770***	4.943***	5.598***	3.940***	1.995***
Inactive hh head	0.810*	1.198**	2.618***	1.519***	1.686***	1.307***	0.659**	1.871***	0.500	1.715***	1.785***
Employment ratio	-0.097	-0.143	-0.662**	-1.128**	-0.376	-0.970***	-0.803***	-0.581*	-0.758**	-0.207	-0.065
Past-unemployed hh head	1.873***	2.276***	0.893**	0.899	1.768***	1.233**	1.915***	2.035***	2.472***	1.567***	0.058
Past-employment ratio	-0.227	-0.151	-0.290	1.178***	0.958***	0.298	-0.180	0.082	-0.388	0.193	0.708**
Good Health hh head	-1.825***	-2.736***	-0.918**	-2.793***	-3.132***	-1.177***	-2.667***	-2.838***	-2.640***	-1.483***	-1.501***
Health ratio	-0.850**	0.125	-0.248	-1.952***	-2.993***	-0.839**	-0.588**	-0.407	-1.940***	-0.629**	-1.597***
Past good Health hh head	-1.652***	-1.867***	-0.890*	-0.633	-1.250***	-1.763***	-1.403***	-0.837	-0.774**	-0.662	-0.853***
Past-health ratio	-0.312	-0.280	-0.397	-0.818*	-1.826***	-0.101	-0.012	-0.397	-0.260	-0.079	-0.340
Club ratio	-1.691***	-1.136***	-0.496**	-0.483	-1.608***	-0.596**	-0.652***	-1.076***	-0.997***	-0.266*	-2.906***
Mortgage	0.029	1.014***	0.737**	1.664***	1.866***	2.562***	1.256***	0.995***	2.160***	1.262***	0.864*
Tenant	1.962***	3.688***	3.001***	5.582***	5.205***	4.684***	2.611***	8.329***	3.475***	2.945***	3.102***
House free	0.720	1.858*	0.571	2.631***	2.409***	0.944	0.882*	1.528	1.406***	-0.194	4.335***
Private transfers	0.895*	1.329***	1.138***	1.263**	1.969***	1.155**	0.310	0.312	2.331***	1.496**	0.248
Unemployment benefits	1.604***	1.336***	0.341	3.037***	1.746***	0.798**	0.949***	1.403***	1.471***	0.816***	0.997*
Old-age/survivors benefits	-1.350***	-1.287***	-1.645***	-0.306	0.468	-1.019**	-1.755***	-1.506***	-0.616**	-0.490	-0.224
Family-related allowances	0.389	-0.120	0.500**	1.485**	2.422***	1.159***	0.330	0.441	0.048	0.118	0.517
Sickness/invalidity benefits	-0.393	0.521	-0.476	1.798**	1.970***	0.718**	0.583*	0.783	0.364	0.634*	0.469
Social assistance	2.150*	8.895***	4.932***	0.032	1.727	5.397***	4.832***	2.783***	5.378***	8.321***	2.739***
Housing allowance	0.936*	2.303	1.174**	-0.730	3.520***	1.587***	3.797***	6.858***	-0.657	1.614***	1.934
Single family	-0.066	1.777**	0.870	-4.459***	-2.506***	-0.334	1.064**	-2.191***	-1.651***	0.370	-0.621
Couple with kids	0.724	1.199***	0.276	1.694***	1.143***	0.880**	0.624**	0.392	0.515	0.551**	0.240
Other family	2.254***	2.389*	1.652	2.813***	2.482***	2.410**	1.479**	1.708**	1.730***	1.580	4.517***
Lone parents	2.281***	5.638***	4.832***	6.588***	4.521***	3.554***	4.647***	4.898***	2.145***	3.644***	4.786***
Number of adults	1.243***	0.661**	0.530**	2.356***	1.934***	0.662***	1.616***	0.906***	1.966***	0.845***	1.979***
Number of children squared	0.388***	0.226**	0.207***	0.483***	0.651***	0.168***	0.239***	0.369***	0.476***	0.132***	0.786***
Age ratio	-1.002**	-0.588	-4.127***	-2.784***	-1.586***	-2.488***	-0.777**	-3.946***	-1.103**	-1.379***	-0.666
Year 1996		1.841***	1.000***	4.089***	2.401***		2.041***	2.656***	0.085	0.341**	4.554***
Year 1997	0.608**	0.968***	0.878***	3.807***	2.191***		1.857***	2.485***	-0.163	0.384**	3.108***
Year 1998	0.441**	0.781***	0.143	2.086***	1.450***	1.514***	0.948***	1.122***	-0.259	0.232	2.815***
Year 1999	0.041	0.180	0.400*	-0.188	0.401*	0.525**	0.985***	0.952***	0.117	-0.327**	2.386***
Year 2000	-0.226	0.155	0.252	0.576**	0.533**	0.165	0.056	0.654***	-0.015	-0.453***	1.861***
Constant	25.774***	24.551***	19.639***	55.377***	44.151***	24.960***	30.193***	23.760***	35.382***	20.550***	41.475***
Number of observation	27308	27689	22135	55022	70535	19227	57895	31867	81924	43910	60805
Number of groups	7404	6749	5747	12807	17278	7278	14040	8642	19155	11113	13526
Wald test	785.262	932.749	1057.361	4015.057	5133.244	1591.301	2593.793	1838.675	2657.347	1583.203	3146.110
p value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2 within	0.011	0.020	0.055	0.059	0.054	0.059	0.040	0.087	0.021	0.051	0.056
R^2 between	0.295	0.380	0.322	0.439	0.497	0.343	0.431	0.466	0.405	0.387	0.431
R^2 overall	0.216	0.280	0.244	0.321	0.362	0.286	0.340	0.395	0.296	0.311	0.345

TABLE A6: RESULTS FROM RANDOM EFFECTS MODEL – CURRENT LIFE STYLE DEPRIVATION INDEX

* p<0.10, ** p<0.05, *** p<0.01 from robust standard errors, adjusted for clustering by household

(Notes. As for Table 1)

	AT	BE	DK	EL	ES	FI	FR	IE	IT	NL	PT
Income	-0.853**	-1.046***	-1.139***	-0.771**	-1.696***	-1.240***	-1.557***	-0.422	-0.970***	-1.689***	-1.286***
Last year's income	-0.504	-1.019***	-1.902***	-4.862***	-3.208***	-1.728***	-1.855***	-0.986***	-1.898***	-1.696***	-2.079***
Two years' ago income	-0.039	-0.491**	-0.289	-0.841***	-0.594***	-0.570*	-0.370***	-0.603**	-0.392***	-0.557***	-0.587***
Higher education hh head	-1.438	0.250	-1.079**	-1.722**	-0.385	-0.888	-0.421	0.144	-0.853	-0.853	-0.373
Higher education ratio	-1.526**	-0.355	0.640	-0.448	-0.571	-1.167*	0.690	-0.420	0.176	-0.863**	1.838**
Unemployed hh head	2.204**	2.581***	3.060***	4.709***	2.162***	3.438***	2.877***	4.638***	4.514***	3.820***	1.913***
Inactive hh head	0.767	0.764	2.796***	1.176*	0.503	2.328***	0.995***	1.366***	0.789*	1.757***	1.463***
Employment ratio	-0.541	-0.070	-0.647**	-2.357***	-1.346***	-1.013***	-0.979***	-0.782**	-0.446	-0.481**	-1.317***
Past-unemployed hh head	0.618	0.787	0.135	0.291	0.979**	0.442	0.672	1.468**	1.483**	1.043**	0.224
Past-employment ratio	-0.485	0.026	-0.224	0.264	-0.073	0.062	-0.215	-0.302	-0.204	-0.042	-0.275
Good Health hh head	-1.043**	-1.209*	-0.196	-2.158***	-1.893***	-0.827*	-1.635***	-1.652**	-1.773***	-0.574	-0.680**
Health ratio	-0.621	0.145	0.114	-1.741***	-1.866***	-0.933**	-0.282	-0.582	-1.613***	-0.371	-1.299***
Past good Health hh head	-0.968**	-0.545	-0.429	0.123	0.107	-1.198**	-0.422	0.423	0.022	0.212	-0.142
Past-health ratio	-0.035	-0.056	-0.241	-0.271	-0.672*	-0.185	0.196	-0.233	0.052	0.414*	-0.053
Club ratio	-0.450	-0.397	0.017	0.381	-0.563**	-0.150	-0.137	-0.195	0.145	0.249	-0.854*
Mortgage	0.245	-0.069	0.425	1.490**	1.200***	0.998***	0.592**	-0.410	2.606***	-0.160	0.631
Tenant	-0.117	-0.488	1.712***	2.462***	3.251***	1.984***	0.263	2.737**	2.097***	0.059	0.428
House free	0.187	0.032	0.490	2.470***	1.403***	1.819*	0.094	1.331	0.938*	-1.466*	1.551**
Private transfers	0.221	0.920**	0.810**	1.197*	1.837**	0.938*	0.835**	0.557	0.989*	1.716**	0.319
Unemployment benefits	0.580	0.055	-0.131	2.421***	0.950**	0.189	0.514	0.290	0.483	0.410	0.517
Old-age/survivors benefits	-0.315	-0.854	-0.260	-0.002	0.328	-0.545	-1.285***	-0.934*	0.005	-0.528	0.349
Family-related allowances	0.195	-0.418	-0.128	0.024	1.085	0.046	0.165	-0.057	-0.171	-0.121	0.327
Sickness/invalidity benefits	-0.021	-0.269	-1.028**	1.324	0.763	0.552	-0.142	-0.414	-0.361	0.089	-0.410
Social assistance	2.309**	4.695**	1.640*	-0.821	-0.056	1.867*	2.113*	1.415**	1.488	5.275***	0.271
Housing allowance	-0.134	1.029	0.365	-1.177	2.543*	1.076	1.931***	3.856	-0.723	0.234	0.125
Single family	-0.585	2.181**	2.863***	-2.155*	1.317	0.526	2.171***	-0.462	0.191	0.153	-2.141**
Couple with kids	0.220	0.552	-0.396	0.474	1.768***	-0.195	0.136	0.133	-0.420	0.444*	-0.504
Other family	0.012	0.199	2.256	2.204	2.295**	3.958**	1.035	2.173*	1.443	1.248	-0.036
Lone parents	0.494	4.065***	4.993***	3.103*	4.209***	1.479	2.810***	2.945***	-0.522	2.201***	0.550
Number of adults	-0.167	-0.059	0.196	1.559***	0.652***	0.259	0.435**	0.302	0.657***	0.272	0.211
Number of children squared	-0.089	0.029	0.086	0.383**	0.299***	0.062	0.026	0.279***	0.323***	-0.062	0.284***
Age ratio	0.419	1.411**	-0.068	-1.959*	-0.938	-1.048	0.745	-1.543	0.307	-1.552***	1.004
Year 1996		2.462***	1.610***	4.876***	3.758***		2.597***	4.422***	1.296***	0.569***	6.548***
Year 1997	0.933***	1.488***	1.381***	4.564***	3.505***		2.352***	4.048***	0.915***	0.580***	4.852***
Year 1998	0.820***	1.236***	0.488**	2.851***	2.621***	2.157***	1.396***	2.446***	0.706***	0.343**	4.395***
Year 1999	0.329	0.453**	0.620***	0.198	1.094***	1.044***	1.373***	1.683***	0.664***	-0.209	3.238***
Year 2000	-0.048	0.248	0.287	0.682***	0.847***	0.400**	0.318**	1.045***	0.211	-0.401***	2.315***
Constant	16.615***	14.281***	14.015***	39.985***	28.509***	19.310***	18.718***	12.617***	21.982***	16.453***	32.757***
Number of observation	27308	27689	22135	55022	70535	19227	57895	31867	81924	43910	60805
Number of groups	7404	6749	5747	12807	17278	7278	14040	8642	19155	11113	13526
F test	2.656	5.511	10.555	20.454	22.623	9.747	18.25	14.987	9.084	11.441	20.78
p value	0	0	0	0	0	0	0	0	0	0	0
R^2 within	0.017	0.028	0.069	0.066	0.062	0.070	0.046	0.100	0.027	0.057	0.074
R^2 between	0.129	0.240	0.153	0.410	0.444	0.233	0.355	0.386	0.325	0.337	0.232
R^2 overall	0.094	0.176	0.133	0.287	0.314	0.197	0.278	0.324	0.234	0.271	0.184

TABLE A7: RESULTS FROM FIXED EFFECTS MODEL – CURRENT LIFE STYLE DEPRIVATION INDEX

* p<0.10, ** p<0.05, *** p<0.01 from robust standard errors, adjusted for clustering by household

(Notes. As for Table 1)

	AT	BE	DK	EL	ES	FI	FR	IE	IT	NL	PT
Income	33,49	30,95	29,53	19,14	22,65	24,98	28,54	27,81	24,72	27,07	17,38
Last year's income	33,83	30,93	29,56	19,12	22,25	24,59	28,52	26,66	24,59	26,62	16,93
Two years' ago income	34,31	31,07	29,00	19,26	21,77	23,97	28,56	25,75	24,38	26,64	16,42
Higher education hh head	0,76	0,67	0,77	0,38	0,28	0,70	0,58	0,43	0,35	0,76	0,11
Higher education ratio	0,52	0,55	0,55	0,40	0,34	0,60	0,45	0,50	0,41	0,51	0,16
Employed hh head	0,63	0,65	0,71	0,62	0,56	0,68	0,64	0,65	0,60	0,69	0,67
Unemployed hh head	0,03	0,05	0,03	0,03	0,07	0,05	0,04	0,06	0,03	0,03	0,03
Inactive hh head	0,34	0,30	0,26	0,35	0,37	0,27	0,32	0,29	0,37	0,28	0,31
Employment ratio	0,42	0,36	0,46	0,32	0,27	0,44	0,35	0,39	0,32	0,32	0,43
Past-unemployed hh head	0,03	0,05	0,04	0,03	0,07	0,06	0,04	0,07	0,03	0,04	0,03
Past-employment ratio	0,42	0,37	0,45	0,31	0,26	0,43	0,34	0,37	0,32	0,31	0,42
Good Health hh head	0,92	0,95	0,95	0,90	0,88	0,93	0,92	0,96	0,87	0,96	0,77
Health ratio	0,83	0,76	0,71	0,81	0,80	0,68	0,76	0,82	0,82	0,75	0,70
Past good Health hh head	0,92	0,95	0,96	0,90	0,87	0,93	0,93	0,96	0,88	0,96	0,78
Past-health ratio	0,83	0,76	0,70	0,80	0,79	0,68	0,76	0,82	0,82	0,75	0,70
Club ratio	0,48	0,36	0,61	0,08	0,25	0,54	0,27	0,43	0,19	0,43	0,16
Owner	0,41	0,35	0,09	0,76	0,67	0,43	0,31	0,50	0,66	0,07	0,58
Mortgage	0,28	0,41	0,65	0,10	0,19	0,35	0,33	0,39	0,12	0,56	0,14
Tenant	0,24	0,21	0,27	0,12	0,09	0,20	0,31	0,10	0,16	0,37	0,18
House free	0,06	0,03	0,00	0,03	0,05	0,01	0,04	0,01	0,05	0,01	0,10
Private transfers	0,05	0,09	0,08	0,04	0,02	0,07	0,07	0,01	0,03	0,01	0,01
Unemployment benefits	0,08	0,13	0,12	0,04	0,09	0,20	0,10	0,16	0,04	0,05	0,04
Old-age/survivors benefits	0,27	0,21	0,17	0,32	0,29	0,21	0,22	0,20	0,31	0,17	0,29
Family-related allowances	0,40	0,40	0,28	0,07	0,02	0,29	0,22	0,39	0,04	0,28	0,38
Sickness/invalidity benefits	0,07	0,09	0,08	0,04	0,09	0,19	0,09	0,09	0,07	0,09	0,09
Social assistance	0,01	0,01	0,02	0,01	0,00	0,05	0,02	0,12	0,00	0,02	0,01
Housing allowance	0,04	0,01	0,08	0,00	0,00	0,09	0,13	0,00	0,00	0,03	0,00
Single family	0,09	0,12	0,17	0,06	0,05	0,14	0,12	0,06	0,06	0,13	0,06
Couple with kids	0,59	0,54	0,42	0,65	0,67	0,49	0,53	0,69	0,71	0,49	0,62
Other family	0,02	0,01	0,01	0,03	0,04	0,02	0,02	0,05	0,03	0,01	0,03
Couple without kids	0,24	0,26	0,35	0,21	0,17	0,31	0,27	0,13	0,15	0,32	0,22
Lone parents	0,06	0,06	0,05	0,05	0,07	0,05	0,06	0,08	0,05	0,05	0,07
Number of adults	2,84	2,42	2,09	2,97	3,19	2,30	2,43	3,26	3,09	2,29	3,10
Number of children	0,61	0,63	0,59	0,50	0,47	0,62	0,59	0,85	0,45	0,62	0,51
Age ratio	0,18	0,18	0,16	0,22	0,21	0,14	0,18	0,16	0,17	0,16	0,22
Number observations	27147	27457	22062	55020	70298	19181	56223	31201	81742	43862	60803

TABLE A8: DESCRIPTIVE STATISTICS

Average values. Income, Last year's income and Two years' ago income are expressed as PPP/1000; Number of adults, Number of children and all ratios are absolute values.
(Notes. As for Table 1)

item	AT		BE		DK		EL		ES		FI		FR		IE		IT		NL		PT	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Overall dimension																						
	$\alpha = 0.7$		$\alpha = 0.7$		$\alpha = 0.65$		$\alpha = 0.79$		$\alpha = 0.73$		$\alpha = 0.69$		$\alpha = 0.71$		$\alpha = 0.76$		$\alpha = 0.74$		$\alpha = 0.65$		$\alpha = 0.82$	
Basic dimension																						
	$\alpha = 0.71$		$\alpha = 0.78$		$\alpha = 0.7$		$\alpha = 0.78$		$\alpha = 0.7$		$\alpha = 0.74$		$\alpha = 0.73$		$\alpha = 0.66$		$\alpha = 0.74$		$\alpha = 0.76$		$\alpha = 0.72$	
House warm	0.16	-0.05	0.44	-0.06	0.32	-0.03	0.53	-0.35	0.46	-0.36	0.17	-0.03	0.37	-0.14	0.32	-0.13	0.51	-0.3	0.42	-0.06	0.52	-0.41
A week holiday	0.52	-0.26	0.59	-0.27	0.53	-0.18	0.6	-0.48	0.54	-0.4	0.54	-0.29	0.51	-0.38	0.42	-0.32	0.55	-0.44	0.59	-0.25	0.58	-0.52
New furniture	0.46	-0.25	0.56	-0.23	0.5	-0.22	0.48	-0.37	0.5	-0.32	0.6	-0.29	0.56	-0.35	0.51	-0.22	0.44	-0.39	0.58	-0.28	0.54	-0.4
New clothes	0.59	-0.12	0.58	-0.1	0.53	-0.12	0.54	-0.3	0.45	-0.15	0.57	-0.18	0.48	-0.18	0.46	-0.16	0.51	-0.22	0.63	-0.22	0.56	-0.37
Good diet	0.52	-0.12	0.5	-0.03	0.34	-0.06	0.48	-0.28	0.32	-0.08	0.46	-0.13	0.42	-0.13	0.24	-0.08	0.42	-0.13	0.41	-0.05	0.28	-0.17
Friends around	0.62	-0.15	0.6	-0.17	0.48	-0.07	0.52	-0.3	0.44	-0.15	0.52	-0.17	0.47	-0.17	0.41	-0.16	0.52	-0.24	0.54	-0.14	0.48	-0.28
House payments	0.13	-0.05	0.25	-0.11	0.18	-0.01	0.36	-0.19	0.16	-0.06	0.32	-0.15	0.31	-0.15	0.25	-0.09	0.22	-0.12	0.2	-0.08	0.1	-0.07
Secondary dimension																						
	$\alpha = 0.58$		$\alpha = 0.53$		$\alpha = 0.53$		$\alpha = 0.68$		$\alpha = 0.59$		$\alpha = 0.58$		$\alpha = 0.58$		$\alpha = 0.66$		$\alpha = 0.61$		$\alpha =0.5$		$\alpha = 0.71$	
Car	0.4	-0.2	0.34	-0.19	0.38	-0.25	0.53	-0.32	0.41	-0.24	0.4	-0.25	0.34	-0.19	0.44	-0.34	0.43	-0.17	0.29	-0.15	0.52	-0.35
Tv	0.15	0	0.13	0.05	0.16	-0.03	0.24	-0.11	0.14	-0.01	0.21	-0.08	0.22	-0.01	0.23	-0.09	0.18	-0.01	0.13	-0.07	0.28	-0.12
Video recorder	0.43	-0.24	0.45	-0.16	0.42	-0.16	0.52	-0.32	0.48	-0.21	0.46	-0.21	0.5	-0.15	0.53	-0.29	0.53	-0.17	0.41	-0.1	0.58	-0.32
Micro wave	0.41	-0.08	0.36	-0.14	0.31	-0.12	0.39	-0.18	0.44	-0.21	0.34	-0.1	0.4	-0.13	0.46	-0.24	0.32	-0.17	0.33	-0.09	0.48	-0.3
Dishwasher	0.5	-0.19	0.34	-0.2	0.39	-0.23	0.48	-0.29	0.32	-0.27	0.37	-0.24	0.36	-0.25	0.4	-0.35	0.34	-0.27	0.3	-0.18	0.37	-0.32
Telephone	0.08	-0.01	0.08	-0.1	0.04	0.01	0.3	-0.15	0.19	-0.13	0.15	-0.06	0.12	-0.09	0.26	-0.14	0.28	-0.09	0.08	-0.04	0.4	-0.2
Housing facilities																						
	$\alpha = 0.69$		$\alpha = 0.69$		$\alpha = 0.76$		$\alpha = 0.53$		$\alpha = 0.71$		$\alpha = 0.87$		$\alpha = 0.76$		$\alpha = 0.88$		$\alpha = 0.65$		$\alpha = 0.71$		$\alpha = 0.88$	
Bath or shower	0.6	-0.09	0.5	-0.1	0.58	-0.04	0.5	-0.19	0.6	-0.05	0.64	-0.07	0.63	-0.11	0.8	-0.07	0.52	-0.05	0.54	-0.03	0.8	-0.21
Indoor toilet	0.48	-0.07	0.5	-0.07	0.64	-0.04	0.5	-0.21	0.53	-0.03	0.82	-0.07	0.55	-0.11	0.79	-0.04	0.42	-0.03	0.48	0.02	0.76	-0.2
Hot water	0.44	-0.07	0.52	-0.09	0.56	-0.03	0.09	-0.05	0.45	-0.09	0.79	-0.08	0.58	-0.1	0.72	-0.07	0.43	-0.04	0.57	-0.02	0.73	-0.22
Housing deterioration																						
	$\alpha = 0.66$		$\alpha = 0.47$		$\alpha = 0.51$		$\alpha = 0.72$		$\alpha = 0.63$		$\alpha = 0.48$		$\alpha = 0.5$		$\alpha = 0.65$		$\alpha = 0.62$		$\alpha = 0.45$		$\alpha = 0.75$	
Leaky roof	0.43	-0.04	0.26	-0.03	0.27	0.02	0.57	-0.14	0.45	-0.08	0.24	0	0.29	-0.05	0.37	-0.06	0.48	-0.07	0.23	-0.02	0.54	-0.13
Dampness	0.5	-0.08	0.33	-0.03	0.34	-0.05	0.59	-0.18	0.48	-0.14	0.32	-0.04	0.34	-0.1	0.54	-0.12	0.45	-0.09	0.32	-0.09	0.6	-0.16
Rot in windows	0.5	-0.06	0.28	-0.07	0.38	-0.02	0.45	-0.15	0.38	-0.07	0.32	-0.06	0.33	-0.1	0.48	-0.11	0.36	-0.08	0.28	-0.06	0.59	-0.19
Environment																						
	$\alpha = 0.53$		$\alpha = 0.44$		$\alpha = 0.44$		$\alpha = 0.47$		$\alpha = 0.56$		$\alpha = 0.43$		$\alpha = 0.46$		$\alpha = 0.56$		$\alpha = 0.55$		$\alpha = 0.4$		$\alpha = 0.5$	
Noise	0.38	0.01	0.31	0.01	0.32	-0.03	0.34	0.1	0.4	0.02	0.35	-0.04	0.36	-0.06	0.44	-0.04	0.38	-0.01	0.3	-0.01	0.36	0.07
Pollution or grime	0.32	0.04	0.23	0	0.27	0	0.35	0.1	0.34	0.04	0.28	0	0.31	0.01	0.4	0	0.37	0.01	0.2	-0.03	0.32	0.06
Shortage of space	0.27	-0.02	0.21	-0.02	0.26	-0.01	0.16	-0.08	0.28	-0.04	0.19	-0.06	0.18	-0.04	0.19	-0.06	0.24	-0.12	0.17	-0.04	0.23	-0.1
Not enough light	0.25	0.01	0.19	-0.06	0.16	-0.01	0.19	-0.07	0.24	-0.03	0.11	-0.02	0.16	-0.08	0.26	-0.06	0.26	-0.09	0.12	-0.03	0.18	-0.13
Crime	0.26	0.01	0.22	-0.03	0.14	-0.03	0.23	0.06	0.32	-0.02	0.21	-0.02	0.23	0.02	0.34	-0.03	0.32	0.01	0.23	-0.02	0.25	0.08

TABLE 1: CRONBACH'S ALPHA AND CORRELATION COEFFICIENTS. DIFFERENT DIMENSIONS OF THE DEPRIVATION SCORE. YEAR 2000.

α = Cronbach's alpha. Column a: correlation with other items in dimension. Column b: correlation with equivalent income

(Countries abbreviations: AT: Austria. BE: Belgium. DK: Denmark. EL: Greece. ES: Spain. FI: Finland. FR: France. IE: Ireland. IT: Italy. NL: the Netherlands. PT: Portugal. Source: author's analysis of the ECHP)

	AT	BE	DK	EL	ES	FI	FR	IE	IT	NL	PT
Income	-1.088***	-1.594***	-0.970***	-1.445***	-1.786***	-0.957***	-1.997***	-0.757***	-1.896***	-1.559***	-2.006***
Last year's income	-1.375***	-1.255***	-1.614***	-3.776***	-3.060***	-1.954***	-2.283***	-1.258***	-1.975***	-1.514***	-2.393***
Two years' ago income	-0.503***	-0.616***	-0.549***	-1.388***	-1.031***	-0.630***	-0.481***	-0.981***	-0.844***	-0.513***	-1.209***
Higher education hh head	-1.518***	-0.692**	-0.336	-3.109***	-1.940***	-0.07	-1.232***	-1.233***	-1.817***	-0.882***	-3.090***
Higher education ratio	-0.979***	-0.766**	0.082	-2.359***	-2.210***	-0.383	-0.285	-1.641***	-0.943***	-0.430**	-1.782***
Unemployed hh head	2.072***	2.215***	1.541***	3.221***	1.596***	2.320***	2.198***	3.322***	3.117***	2.208***	1.436**
Inactive hh head	0.231	0.378	1.546***	1.244***	0.806***	0.708**	0.437*	0.893***	0.205	0.637***	1.327***
Employment ratio	-0.015	0.133	-0.511**	-0.385	-0.059	-0.859***	-0.500***	-0.165	-0.368	0.249*	0.034
Past-unemployed hh head	2.133***	1.415**	0.429	0.471	0.983***	0.614*	1.478***	1.498***	1.174**	1.013***	0.153
Past-employment ratio	0.123	-0.014	-0.460**	0.488*	0.617**	0.099	-0.067	0.224	-0.399*	0.07	0.729***
Good Health hh head	-1.414***	-1.928***	-0.402	-2.381***	-2.503***	-1.027***	-1.978***	-3.027***	-2.101***	-0.798***	-1.730***
Health ratio	-0.751**	0.099	-0.491*	-1.657***	-2.302***	-0.213	-0.427**	-1.315***	-1.700***	-0.438**	-1.910***
Past good Health hh head	-1.278***	-1.264***	-0.740*	-0.716**	-0.899***	-1.292***	-0.963***	-0.558	-0.605***	-0.591*	-0.947***
Past-health ratio	-0.424	-0.159	-0.091	-0.710**	-1.087***	-0.025	-0.189	-0.481	-0.633***	-0.193	-0.726***
Club ratio	-1.140***	-0.949***	-0.397**	0.552	-0.412**	-0.219	-0.13	-0.630***	-0.342*	-0.154	-1.301***
Mortgage	-0.299	0.077	-0.606**	0.659	0.623***	1.540***	0.121	0.459*	1.506***	0.118	-0.264
Tenant	3.082***	4.565***	2.947***	4.341***	5.356***	4.676***	3.755***	5.946***	4.061***	3.317***	6.722***
House free	1.034***	2.455***	2.861**	2.434***	2.851***	1.416*	2.057***	1.063	1.740***	-0.004	5.963***
Private transfers	1.295***	1.157***	0.939***	0.428	1.580***	1.024***	0.341	-1.002	1.433***	0.675	-0.366
Unemployment benefits	1.067***	0.892***	0.519**	1.474***	1.116***	0.500**	0.352	1.068***	0.597*	0.571**	-0.137
Old-age/survivors benefits	-0.570*	-0.805**	-1.845***	-0.106	-0.122	-0.704**	-1.287***	-0.714**	-0.439*	-0.511**	0.184
Family-related allowances	0.064	-0.043	0.686***	1.089**	1.764***	0.774***	0.278	0.264	0.025	0.158	0.108
Sickness/invalidity benefits	-0.11	0.412	-0.312	1.269**	1.333***	0.246	0.469**	0.602	0.23	0.668**	0.397
Social assistance	0.88	6.690***	2.826***	-0.566	1.024	3.094***	3.227***	1.637***	3.511**	4.852***	0.572
Housing allowance	0.02	1.47	-0.232	-0.875	2.412***	0.501	1.854***	5.521***	0.037	0.645*	0.014
Single family	-0.194	1.202**	0.181	-1.530***	-0.900**	-0.132	0.482	-1.557**	-1.213***	0.503	0.196
Couple with kids	0.598*	0.978***	0.276	0.647	0.999***	0.452	0.712***	-0.099	0.411	0.357*	0.217
Other family	1.742***	1.771*	1.286	2.976***	1.984***	1.514*	0.619	1.259**	1.576***	0.909	3.997***
Lone parents	1.232**	3.791***	2.318***	3.528***	3.234***	2.206***	2.861***	2.788***	1.822***	2.298***	3.424***
Number of adults	0.763***	0.451**	0.395*	1.756***	1.499***	0.312*	0.953***	0.732***	1.351***	0.631***	1.537***
Number of children squared	0.280***	0.183***	0.164***	0.365***	0.472***	0.110***	0.206***	0.280***	0.357***	0.182***	0.480***
Age ratio	-0.948**	-0.174	-3.225***	-0.928*	-0.812**	-1.807***	-0.923***	-1.769***	-0.385	-1.759***	0.295
Year 1996		-0.823***	0.042	-0.778***	-0.299*		-0.230*	-0.064	-0.005	0.118	-0.939***
Year 1997	-0.405***	-0.982***	-0.582***	-1.478***	-0.626***		-0.698***	-0.735***	0.063	-0.106	-1.124***
Year 1998	-0.862***	-1.345***	-0.338**	-2.367***	-1.858***	-0.571***	-0.564***	-1.098***	0.07	-0.474***	-1.537***
Year 1999	-0.979***	-1.319***	-0.365**	-2.180***	-2.126***	-0.897***	-1.175***	-1.272***	-0.315**	-0.512***	-2.172***
Year 2000	-1.159***	-1.572***	-0.555***	-3.208***	-3.183***	-1.093***	-1.250***	-1.798***	-0.311*	-0.269**	-3.192***
Constant	19.318***	20.640***	16.589***	38.686***	31.236***	18.500***	24.407***	19.478***	25.419***	16.464***	33.622***
Number of observation	27147	27457	22062	55020	70298	19181	56223	31201	81742	43862	60803
Number of groups	7400	6740	5744	12807	17271	7271	13780	8604	19151	11111	13526
Wald test	736.151	867.296	1100.108	2670.115	3619.442	1429.503	2234.857	1307.374	2022.679	1633.008	2262.282
p value	0	0	0	0	0	0	0	0	0	0	0
R^2 within	0.02	0.029	0.05	0.051	0.071	0.054	0.036	0.063	0.02	0.046	0.055
R^2 between	0.266	0.346	0.315	0.356	0.411	0.314	0.368	0.408	0.346	0.34	0.4
R^2 overall	0.198	0.27	0.239	0.264	0.301	0.26	0.295	0.343	0.256	0.266	0.331

TABLE 4: RESULTS FROM RANDOM EFFECTS MODEL – OVERALL DEPRIVATION INDEX
* p<0.10, ** p<0.05, *** p<0.01 from robust standard errors, adjusted for clustering by household
Income is the natural logarithm of net annual income expressed in PPS/1000
(Notes. As for Table 1)

	AT	BE	DK	EL	ES	FI	FR	IE	IT	NL	PT
Income	-0.503**	-0.676***	-0.790***	-0.362	-0.719***	-0.646**	-0.925***	-0.135	-0.679***	-1.199***	-0.769***
Last year's income	-0.635**	-0.636***	-1.197***	-2.730***	-1.746***	-1.175***	-1.091***	-0.46	-0.999***	-1.110***	-1.307***
Two years' ago income	-0.1	-0.214	-0.312	-0.473***	-0.403***	-0.517**	-0.188*	-0.207	-0.201*	-0.376***	-0.409**
Higher education hh head	-0.873	0.108	-0.865**	-1.283**	-0.728*	0.026	0.468	0.059	-0.687*	-0.16	-0.415
Higher education ratio	-0.983**	-0.5	0.308	-0.871	-0.218	-0.804*	0.601*	-0.374	0.128	-0.755**	1.958***
Unemployed hh head	1.357**	1.084*	1.335***	2.732***	0.856**	1.933***	1.553***	3.050***	2.316***	1.983***	1.138*
Inactive hh head	0.317	-0.003	1.599***	0.993**	-0.058	1.311***	0.712***	0.253	0.42	0.792***	0.899**
Employment ratio	-0.222	0.293	-0.559**	-1.085***	-0.568**	-1.018***	-0.643***	-0.388	-0.179	0.085	-0.863***
Past-unemployed hh head	1.291**	0.22	-0.203	0.022	0.314	-0.007	0.62	1.146**	0.388	0.533	0.052
Past-employment ratio	0.091	0.227	-0.431*	-0.062	0.098	-0.149	-0.14	-0.029	-0.252	-0.015	0.077
Good Health hh head	-0.904**	-1.033**	0.134	-1.911***	-1.776***	-0.566*	-1.263***	-2.221***	-1.469***	-0.067	-1.055***
Health ratio	-0.482	0.241	-0.245	-1.569***	-1.605***	-0.137	-0.097	-1.314***	-1.314***	-0.093	-1.488***
Past good Health hh head	-0.856**	-0.486	-0.428	-0.174	-0.102	-0.715*	-0.332	0.173	0.028	0.148	-0.36
Past-health ratio	-0.117	0.113	0.073	-0.374	-0.387	0.053	0.082	-0.228	-0.282	0.264	-0.296
Club ratio	-0.438*	-0.394*	0.093	1.243***	0.383*	0.079	0.115	0.024	0.455**	0.221	-0.084
Mortgage	-0.175	-0.539*	-0.811**	0.777	0.181	0.531*	-0.072	-0.485	1.573***	-0.823**	-0.925**
Tenant	0.961*	2.301***	2.016***	2.637***	3.755***	2.667***	2.705***	1.278	2.483***	1.758***	3.018***
House free	0.633	1.463*	3.092*	2.101***	2.220***	1.910**	1.928***	0.498	1.245***	-0.759	3.035***
Private transfers	0.806*	0.960***	0.707***	0.333	1.260**	0.817**	0.616**	-1.018	0.534	0.488	-0.518
Unemployment benefits	0.425	0.124	0.16	0.849*	0.826***	0.049	0.059	0.328	0.154	0.367	-0.535
Old-age/survivors benefits	-0.098	-0.585	-0.878**	0.047	-0.219	-0.278	-1.129***	-0.374	-0.071	-0.307	0.429
Family-related allowances	-0.091	-0.249	0.161	0.138	0.774	0.104	0.139	-0.103	-0.118	0.053	0.214
Sickness/invalidity benefits	-0.101	-0.05	-0.780**	0.981	0.655	0.147	0.073	-0.105	-0.195	0.304	-0.179
Social assistance	0.975	4.225***	0.489	-1.016	-0.473	0.975	1.478*	0.388	0.933	2.860***	-1.246
Housing allowance	-0.442	0.666	-0.541	-1.099	1.48	0.585	0.906***	4.165*	-0.172	-0.104	-0.67
Single family	-0.661	1.015	1.549**	-1.383*	0.882	-0.117	1.579***	-1.817*	-0.427	0.442	-1.268
Couple with kids	0.662	0.838**	-0.399	-0.313	1.235***	-0.291	0.201	-0.541	-0.153	0.357*	-0.038
Other family	0.624	0.016	1.569	1.617	1.001	2.504**	0.372	0.376	0.86	0.905	0.68
Lone parents	0.607	2.380***	2.032***	0.882	2.438***	0.801	1.820***	0.858	-0.269	1.412***	0.968
Number of adults	0.181	-0.045	0.412*	1.303***	0.771***	0.413*	0.470***	0.426**	0.668***	0.348**	0.542***
Number of children squared	0.039	0.03	0.106**	0.354***	0.287***	0.071	0.143***	0.168***	0.261***	0.067	0.246***
Age ratio	-0.437	1.035**	0.005	-1.098	0.01	-0.682	-0.272	-1.068	0.667	-1.267***	-0.256
Year 1996		-0.847***	-0.047	-0.783***	-0.292*		-0.259**	-0.19	-0.104	0.099	-1.043***
Year 1997	-0.350**	-1.051***	-0.803***	-1.440***	-0.711***		-0.740***	-0.999***	-0.091	-0.180*	-1.256***
Year 1998	-0.845***	-1.499***	-0.634***	-2.461***	-2.217***	-0.624***	-0.627***	-1.726***	-0.333**	-0.554***	-2.046***
Year 1999	-1.011***	-1.574***	-0.807***	-2.413***	-2.703***	-1.144***	-1.306***	-2.147***	-0.901***	-0.645***	-2.876***
Year 2000	-1.262***	-1.869***	-1.041***	-3.492***	-3.934***	-1.448***	-1.542***	-2.916***	-1.036***	-0.453***	-4.132***
Constant	13.846***	13.929***	13.020***	30.806***	22.306***	15.149***	15.055***	13.124***	16.965***	13.044***	28.960***
Number of observation	27147	27457	22062	55020	70298	19181	56223	31201	81742	43862	60803
Number of groups	7400	6740	5744	12807	17271	7271	13780	8604	19151	11111	13526
F test	3.902	6.39	9.13	17.071	30.681	9.296	15.083	10.893	8.946	12.024	18.62
p value	0	0	0	0	0	0	0	0	0	0	0
R^2 within	0.024	0.035	0.062	0.056	0.079	0.063	0.041	0.076	0.024	0.05	0.067
R^2 between	0.221	0.29	0.153	0.334	0.368	0.23	0.316	0.312	0.294	0.303	0.312
R^2 overall	0.162	0.221	0.131	0.238	0.258	0.192	0.253	0.259	0.214	0.238	0.243
Hausman test (vs RE)	150.36***	136.46***	144.25***	171.89***	220.56***	134.35***	163.86***	135.13***	248.44***	138.69***	439.61***

TABLE 5: RESULTS FROM FIXED EFFECTS MODEL – OVERALL DEPRIVATION INDEX
* p<0.10, ** p<0.05, *** p<0.01 from robust standard errors, adjusted for clustering by household
(Notes. As for Table 1)