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INCOME POVERTY AND MULTIDIMENSIONAL DEPRIVATION: LESSONS FROM CROSS-REGIONAL ANALYSIS

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The study of multidimensional deprivation has become one of the most relevant lines of research in the analysis of low-income households. The search for significant relationships between multidimensional deprivation and income poverty has been a central issue and most empirical studies have found a very weak link. This paper aims at examining the possibility of an aggregation bias in national-level studies, which could conceal disparities between regions. As regional differences and decentralization processes stand out in Spain as compared to other OECD countries, we focus the analysis on this country. Latent class models are used to define deprivation indices using the Spanish EU-SILC. The results seem to show that the absence of significant relationships between both phenomena still holds at a regional level. The decomposition methods used in the paper show that it might be due to some regional singularities in some determining factors of income and multidimensional poverty.

1. Introduction

The notion of poverty has undergone significant changes in recent years. The generalized dissatisfaction produced by the use of strictly income-based criteria has given rise to the development of new approaches and measurement procedures that are based on a multidimensional view of poverty. Several proposals have appeared in the literature that attempt to measure the level of multidimensional deprivation in a society (Brandolini and D'Alessio, 2000; Atkinson, 2003; Bourguignon and Chakravarty, 2003; Dutta *et al*., 2003; Deutsch and Silber, 2005; Chakravarty and D'Ambrosio, 2006; Duclos *et al*., 2006). This development has made available new aggregation methods for the different dimensions of poverty as well as a set of more robust properties and axioms to construct synthetic multidimensional deprivation indices (Kakwani and Silber, 2007; Silber, 2007).

The development of new procedures to analyze multidimensional poverty[1] has not been enough, however, to contribute decisively to the clarification of what

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[1]For a better understanding, the reader should consider that multidimensional poverty and deprivation are used synonymously in this paper.

can undoubtedly be considered as the key issue in the economic literature on social deprivation. Since Townsend's (1979) groundbreaking contribution and the works of Desai and Shah (1988), the search for significant relationships between multidimensional deprivation and income poverty indicators has become the keystone of the specialized literature. Subsequent studies have made an effort to find this relationship in a wider sample of countries. The results, however, cannot be considered conclusive either in the European Union (Layte *et al*., 2001a, 2001b) or in the United States (Mayer and Jencks, 1989, 1993; Rector *et al*., 1999; Bradshaw and Finch, 2003; Iceland and Bauman, 2004).

Most of the efforts to explain the lack of statistically significant relationships between income poverty and multidimensional deprivation have been based on two kinds of complementary arguments. The first one focuses its attention on the difference in the type of individual well-being components considered by each approach. The second one alludes to the need of introducing a dynamic perspective to properly understand the possible relationships. Income poverty is by definition an indicator of a temporary lack of income, while the different manifestations of multidimensional deprivation have more to do with permanent income. As stated by Iceland and Bauman (2004), persistent poverty could determine multidimensional deprivation through three different channels: it cumulatively increases the differential between the necessary and the available resources to fulfill basic needs; it produces long-term deficiencies in the ability to fulfill such needs; and it gives rise to more erratic incomes. It is not easy, however, to isolate the relationship between the two phenomena over time. Slight variations in reported incomes and in the information about the lack or not of certain items can give rise to observable changes of some relevance, which are essentially caused by measurement errors. Nevertheless, the empirical evidence seems to point toward the existence of a weak correlation and only a small percentage of individuals that exit poverty also leave the situation of multiple deprivation (Layte *et al*., 2001a; Berthoud *et al*., 2004).

A major criticism of a substantial part of the studies focusing on the relationship between multidimensional and income poverty is that empirical analyses usually consider excessively aggregated data. There are very different sources of heterogeneity arising from the use of national data and relatively little is known about the extent of a possible aggregation bias that could conceal significant relationships between both phenomena in more restricted geographical areas. The search for a different level of correlation using regional instead of national data motivates the research summarized in this paper. In order to allow regional analysis of income and multidimensional poverty which may be more meaningful to understand potential relationships between both variables, we use data from Spanish regions. The main reason for choosing Spain is that regional differences and territorial decentralization stand out among OECD countries. The dispersion of unemployment rates, the different demographic structure of the regions, or the growing disparity in social policies as a result of the regional decentralization process could give rise to very different relationships between multidimensional deprivation and income poverty. These dissimilarities and the fact that knowledge about divergence of poverty rates is very limited justify on their own the analysis of differences concerning

the incidence of income and multidimensional deprivation in the Spanish regions.[2]

Among the different approaches to multidimensional deprivation we estimate indices of material deprivation. This task inevitably entails selecting the most relevant characteristics determining individual well-being and developing the procedures that would allow for their aggregation. Multidimensional deprivation is estimated through a latent class model using the data from the Spanish Survey on Income and Living Conditions (EU-SILC). The reason for choosing this type of model is the various difficulties encountered when trying to obtain objective indices that consistently sum up the deprivation suffered by households as well as their weighting and the interest in classifying households. Latent class models can help to overcome part of the usual arbitrariness arising when setting deprivation thresholds. However, they also face important limitations due to the lack of theoretical justification of the weightings schemes used by these models and the potential lack of correspondence between the resulting stratification of poverty and normative views of multidimensional poverty.

The relationships between income poverty and multidimensional deprivation are estimated through different statistical procedures, including decomposition of both variables through non-linear models. Results seem to show that the lack of significant relationships between both phenomena still holds at a regional level. We use the extended version of the Blinder–Oaxaca decomposition proposed by Yun (2004) to test the extent to which there might or might not be similar determinants of income and multidimensional deprivation in each region. The general idea is to measure whether or not differences in some of the factors explaining both phenomena in some regions could explain their apparently limited relationship. Regional differences in economic growth, wealth, and employment levels, along with differences in the patterns of demographic change or labor characteristics could be concealing the existence of very different ways to translate low income into changes in living conditions. Our results show that the determinants of income poverty and multiple deprivation are rather heterogeneous, suggesting the possibility of very different relationships across regions.

The paper is organized as follows. Section 2 gives a summary of the main issues concerning multidimensional poverty measurement, and the main characteristics of the database used are presented. Section 3 presents our estimates of the regional distribution of multidimensional deprivation and income poverty and different statistical tests of the relationship between both phenomena. In Section 4 both variables are decomposed in each region, taking into account differences in household characteristics in the various regions and the different effect of such characteristics in each region. Concluding comments are given in Section 5.

[2]Results for the relationship between income poverty and multidimensional poverty in Spain suggest that it is neither linear nor significant. Martínez and Ruiz-Huerta (1999) studied the relationship between different deprivation indices and the income distribution to find a negative correlation that, however, was not very high. Ayllón *et al.* (2007) found similar results using more recent data. Ayala and Navarro (2007) also found that changes in income were not relevant to spells into and out of housing deprivation.

2. Methodology and Data

2.1. *Methodology*

The analysis of the relationships between income poverty and multidimensional deprivation requires the construction of composite indices. We follow a standard approach to measure income poverty, choosing a cut-off point in the income distribution defined as a percentage of median income. As is well known, the measurement of relative poverty involves many methodological options and results are highly sensitive to the final decisions. The range of options includes choosing an indicator of welfare, the unit of analysis, the equivalence scale, considering mean or median income, defining the relative threshold, and selecting a synthetic measure. Our income poverty threshold is set at 60 percent of the median income of the entire population adjusted by the OECD modified equivalence scale.

We use the most common measures to analyze the incidence and intensity of poverty that are given by the index of Foster *et al*. (1984):

$$P^{\alpha} = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^{\alpha}, \text{ with } \alpha \geq 0, \tag{1}$$

where y_i is individual i's income, $z > 0$ is the poverty line, n the number of individuals in the population, and q the number of poor people. When $\alpha = 0$ this P^0 index is equal to the headcount ratio and when $\alpha = 1$ the index is equivalent to the poverty gap times the poverty rate. The parameter α can be interpreted as the degree of aversion to inequality.

The range of options for multiple deprivation composite indices is very broad. Since Townsend's (1979) seminal contribution, a rapidly expanding literature has focused on alternative proposals of weightings systems. Some of the classical studies on multidimensional deprivation, such as Townsend (1979), Mack and Lansley (1985), and Mayer and Jencks (1989), assign an equal weighting to each partial indicator. The main drawback of this approach is the lack of differentiation among some components, which clearly differ as to their contribution to overall deprivation. A straightforward alternative is extracting the weightings from the observed frequencies. Halleröd (1994), for instance, gives greater importance to the absence of goods considered as necessary by the majority of the population, while Desai and Shah (1988) give a different weight to each attribute in accordance with the proportion of individuals or households that possess them. Other studies use alternative structures, particularly when the information that serves as a basis for the empirical exercise does not reflect social perceptions on the need for items or activities.

The main alternative to arithmetic or weighted means is to construct weightings schemes based on multivariate statistical techniques like principal component analysis (Ram, 1982; Maasoumi and Nickelsburg, 1988; Klasen, 2000), cluster analysis (Hirschberg *et al*., 1991; Ferro *et al*., 2008), multiple correspondence analysis (Asselin and Tuan Anh, 2008), or the latent variable models:[3] factor

[3]Depending on the type of latent variable and indicators, four latent variable models can be identified: factor analysis (continuous latent variable and indicators), latent trait models (continuous latent variable and categorical indicators), latent profile analysis (categorical latent variable and continuous indicators), and latent class models (categorical latent variable and indicators).

analysis (Nolan and Whelan, 1996; Layte *et al.*, 2001a; Whelan *et al.*, 2001), latent trait models (Gailly and Hausman, 1984; Cappellari and Jenkins, 2007), or latent class models (Dewilde, 2004; Pérez-Mayo, 2005; Ayala and Navarro, 2007; Nolan and Whelan, 2007).

Interest in latent variable models for the measurement of multidimensional deprivation has heightened recently. These models are especially helpful in this context since they allow us to understand the relationship between the "true" deprivation—not observed—and the set of indicators that capture different aspects of this complex phenomenon. Among the different options listed above, we use a latent class model, which was initially proposed by Lazarsfeld (1950) and Lazarsfeld and Henry (1968), to estimate multiple deprivation. This model assumes that there are T exhaustive and mutually exclusive latent classes—an individual belongs to one and only one class—and also that the indicators are mutually independent conditional on latent class membership. Therefore, latent class model could be defined as the categorical translation of factor analysis with a remarkable difference: the main goal is identifying groups of individuals instead of clusters of variables.

A clear advantage of these models is that the allocation of individuals to the identified classes endogenously determines the deprivation threshold. We avoid therefore the usual arbitrariness arising when setting deprivation thresholds. However, there are also important limitations due to the lack of theoretical justification of the weightings schemes used by these models. For some authors, this limitation is overcome by the possibility of insightful analyses on the structure on poverty since latent class modeling provides a platform to monitor changes in the shape and form of poverty. As stressed by Grusky and Weeden (2007, p. 33), our knowledge is very limited on questions such as "whether poverty is increasingly taking on a highly organized class form, whether new types of inconsistencies and disorganization are emerging within the poverty space, or whether poverty is increasingly assuming a simple gradational form of the sort that the income paradigm implies."

In order to identify deprivation we need to estimate first a latent variable L representing the unobserved concept of multidimensional poverty. Then, individuals can be assigned to different classes of deprivation. Given a set of binary[4] deprivation indicators ($D_1, \ldots, Dp$), the probability of suffering deprivation in a given indicator k for a randomly selected individual can be defined conditional on the latent class t where $t = 1, \ldots, T$ and T reflect the number of latent classes. This probability is as follows:

$$\pi_{k|t} = \text{Prob}(D_k = 1 | L = t), t = 1, \ldots T. \tag{2}$$

Besides, each individual has a probability δ_t of belonging to any of the t classes where $\sum_{t=1}^{T} \delta_t = 1$.

[4]The assumption of binary partial deprivation indicators comes from the empirical data used in this paper. Although the latent model can be estimated from any categorical (binary or polytomous) variable, all the selected indicators are dichotomous variables.

The joint pattern of deprivation observed in individuals $\pi(x_1, \ldots, x_p)$ for all the indicators can be defined as

$$\pi(x_1, \ldots, x_p) = \sum_{t=1}^{T} \delta_t \prod_{k=1}^{p} \pi_{k|t} = \sum_{t=1}^{T} \delta_t \left[\text{Prob}(D_1 = k_1 | L = t) \cdots \text{Prob}(D_p = k_p | L = t) \right], \tag{3}$$

where k_j is 1 if the individual suffers deprivation in indicator j and 0 otherwise. Therefore, the probability that an individual suffers a given pattern of deprivation indicators is a linear combination of the probability of belonging to each latent class and the conditional probabilities of suffering deprivation in each indicator given any latent class.

The latent class model is estimated through the EM algorithm (Dempster *et al.*, 1977).[5] Since the number of latent class is *a priori* unknown—it is an exploratory latent class model—the estimation procedure must be done by assuming different number of classes and, afterwards, the best model is selected by using the goodness of fit statistics. In order to test the existence of different deprivation patterns, an exploratory analysis was performed and several models were estimated. Finally, the two-class model—deprived and non-deprived individuals—was selected because it showed the best fit to our data.

The final step in the analysis consists of assigning each individual to the different classes of the latent variable L depending on the modal probability. First, the probabilities of belonging to every class given the observed patterns are computed; and second, each individual is assumed to belong to the most likely class.

2.2. *Data*

The Spanish sample for 2005 of the Survey on Income and Living Conditions (EU-SILC) was used in this study. The main aim of EUROSTAT in creating this database was to achieve comparability of results from different Member States of the European Union. More precisely, an effort was made to have a source allowing income distribution and social exclusion to be compared within the European context. In order to achieve this, the questionnaires, data gathering, coding and weightings systems were harmonized as much as possible. The Spanish sample includes 36,678 observations.

The design of the Survey on Income and Living Conditions allows one to gather detailed information on each household member's income, along with different aspects related to material and demographic conditions. It includes some subjective assessments on the financial difficulties faced by households. It also provides territorial disaggregation by NUTS-2 or regions, which constitute the ideal unit of analysis to study territorial differences in countries like Spain. Moreover, information about material well-being indicators is abundant, which can serve as a basis to construct multidimensional deprivation indices.

[5]This algorithm is an iterative procedure used to estimate model parameters when some components are missing.

The survey includes information on issues like subjective assessments on the capacity to meet a wide range of needs concerning both items and activities (eating meat or fish every two days, a week of paid holidays at least once a year or keeping the dwelling at an appropriate temperature in winter), difficulties encountered in covering ordinary costs (mortgage repayments, rent, utility bills, or hire purchase instalments), household amenities (the existence of a bath, shower, and toilet, among others), the presence of housing problems (lack of space, insufficient natural light or leaks and damp), and possessing some items (automobile, color television, washing machine, telephone, etc.), along with information on the reasons for lacking an item. This latter point is highly important given that it allows one to apply the principle of "enforced lack" when assessing the indicators.

These advantages, however, come with some disadvantages. The survey does not contain information on consumption, which prevents the description obtained through income and living conditions from being completed. If consumption patterns were known, the influence exerted by the structure of preferences in the responses to some questions on economic capacity could be controlled. Likewise, the information on the economic situation and living conditions only refers to the capacity to acquire items or do activities, without measuring how many times such items and activities are acquired or carried out.

3. Income Poverty and Multiple Deprivation: A Cross-Regional Analysis

3.1. *Poverty and Multidimensional Deprivation in the Spanish Regions*

Once the methodology and the database used have been presented, it is possible to arrive at an overall approximation to the incidence of income poverty and multidimensional deprivation in each Spanish region. Some definitions are needed to have a clear picture of the notion of multiple deprivation the paper deals with. In keeping with prior research, subjective perceptions, health status, social relationships, or the employment situation have not been included among the deprivation indicators' components. Concerning the level of analysis, although some authors like Layte *et al*. (2001a) or Whelan *et al*. (2001, 2002) differentiate between the quality of the surroundings (pollution, noise, vandalism, and crime) and of the dwelling (lack of light or space, leaks, rot in floors or window frames, damp, and lack of household amenities) in order to analyze housing conditions, some have shown that the former do not seem to discriminate among Spanish households studies (Pérez-Mayo, 2003).

The indicators selected to construct the multidimensional deprivation index include items like not being able to afford a week's paid holiday, eating meat or fish every two days, having a car, telephone, color television, computer, washing machine, or not being up-do-date with ordinary payments,[6] along with living conditions deficiencies like lack of space or light, the presence of leaks or damp, or problems in keeping the dwelling at an appropriate temperature during the winter. The aggregate deprivation index therefore measures a notion of poverty that goes beyond basic needs, as it includes some questions related to lifestyle.

[6]We suppose that a household is late with ordinary payments if it is late concerning at least one of the following payments: rent, mortgage repayments, utility bills, or other loan repayments.

TABLE 1
REGIONAL DISTRIBUTION OF INCOME POVERTY AND MULTIDIMENSIONAL DEPRIVATION

Regions	P^0	P^1	Deprivation	Equivalent Income	Per Capita Income
Andalusia	27.02% (4)	0.0770 (6)	27.77% (3)	10205 (16)	6509 (16)
Aragon	16.57% (11)	0.0567 (9)	12.35% (13)	13062 (7)	8592 (7)
Asturias	15.18% (12)	0.0490 (12)	12.99% (12)	13118 (6)	8837 (6)
Balearic Islands	16.69% (10)	0.0556 (11)	20.60% (7)	13499 (5)	8883 (5)
Canary Islands	28.06% (3)	0.0928 (3)	37.81% (1)	10469 (14)	6713 (13)
Cantabria	14.90% (13)	0.0382 (13)	11.31% (14)	12976 (8)	8488 (8)
Castilla-La Mancha	29.04% (2)	0.0969 (2)	16.61% (9)	10422 (15)	6697 (15)
Castilla y León	24.74% (6)	0.0784 (5)	14.26% (11)	11274 (12)	7434 (10)
Catalonia	12.47% (14)	0.0360 (14)	17.29% (8)	13873 (4)	9134 (4)
Valencia	19.79% (7)	0.0599 (8)	20.98% (6)	11346 (11)	7393 (12)
Extremadura	34.63% (1)	0.1080 (1)	31.14% (2)	9501 (17)	6229 (17)
Galicia	19.26% (8)	0.0557 (10)	25.59% (4)	11459 (9)	7501 (9)
La Rioja	19.13% (9)	0.0672 (7)	8.65% (16)	11352 (10)	7433 (11)
Madrid	11.89% (14)	0.0323 (15)	15.21% (10)	14574 (2)	9524 (2)
Murcia	25.02% (5)	0.0808 (4)	24.68% (5)	10587 (13)	6710 (14)
Navarre	9.72% (16)	0.0303 (16)	5.85% (17)	15825 (1)	10299 (1)
Basque Country	9.67% (17)	0.0289 (17)	10.52% (15)	14268 (3)	9497 (3)
Spain	19.42%	0.0585	20.31%	12201	7959

Note: Ranks are in parentheses.
Source: Own elaboration from Spanish EU-SILC data (2005).

The usual methodological discussion on regional or national thresholds in the measurement of poverty can also affect multiple deprivation analysis. Deprivation classes are estimated for the whole Spanish population, and then regional deprivation rates are computed by counting deprived individuals in each region.[7] This procedure is somewhat similar to applying national thresholds to measure income poverty. A very different alternative could have been considering regional thresholds as reference by estimating a latent class model for each region using regional populations. We use, therefore, a national-level reference to measure multiple deprivation and income poverty.

The estimated multidimensional deprivation and income poverty indices estimated for the different regions are shown in Table 1. The most relevant result concerning the first of these phenomena is the existence of a significant territorial dispersion of the multidimensional deprivation index ("Deprivation" column). The rates for the Canary Islands, for instance, almost double the national average, while just the opposite happens in La Rioja and Navarre. Madrid and Valencia, which have higher rates than those expected according to their income levels, also stand out.

Table 1 also shows the results of the two poverty indicators proposed—incidence and intensity—by regions (P^0 and P^1 columns). Two results are worth mentioning. First, the rankings and dispersion of poverty measures are, in general terms, fairly similar to those obtained for deprivation rates.[8] This similarity could

[7]Only one latent class model—a national one—is estimated using LEM software (Vermunt, 1998). The two-class model was chosen because it showed the lowest BIC value: −37782.

[8]The regional coefficients of variation are 2.67, 2.50, and 2.14 for P^0, P^1, and the multidimensional deprivation index, respectively.

be a preliminary indication of a possible statistical relationship between the two measures. Second, a certain correspondence between the poverty incidence and intensity rankings stands out in most of the regions. Although there are factors causing a natural differentiation among regions, like the different levels of ageing—a variable associated with a great incidence of poverty in Spain but with very limited effects on poverty intensity—there are not too many re-orderings and in no case does a region having a low incidence of poverty face problems of high intensity. Furthermore, results show a clear linear relationship with the regional mean level of income for the two poverty measures, with the richest regions having substantially lower values.[9]

3.2. *The Relationship between Income Poverty and Multidimensional Deprivation*

The general finding of only partial re-orderings among regions when using multidimensional deprivation or income poverty measures somewhat changes the picture presented in some of the sections above. Numerous studies focusing on poverty and living conditions in some developed countries have reached the conclusion that low income levels do not necessarily entail insufficient living conditions. As abovementioned, the available studies for Spain (Martínez and Ruiz-Huerta, 1999; Ayllón *et al*., 2007) show a weak relationship between income and multidimensional poverty measures.

A general procedure to study the possible relationships between the incidence of multidimensional deprivation and income poverty consists of observing how deprivation is distributed by income percentiles. If there were a clear relationship, a monotonous decreasing trend would be expected. Figure 1 shows the unequal distribution of multidimensional deprivation by income deciles for the entire Spanish population. Although the profile seems to show a moderately curved trend, it clearly demonstrates that the incidence of deprivation is much higher in the first two deciles.

Therefore, a significant level of statistical association between income poverty and overall deprivation indices can be expected. A direct approach to analyzing the correspondence between both indicators consists of creating a matrix summarizing the possible states of the households (Halleröd, 1994; Nolan and Whelan, 1996). Table 2 shows that the "consistently poor"—those considered poor using both income and deprivation criteria—are relatively few (around 7 percent of households). These results do not appear to be particularly sensitive to the method used to measure deprivation. Simulations were conducted with other deprivation indices used in the literature, such as the indices of Nolan and Whelan (1996) and Bossert *et al.* (2007). These were compared with the households' equivalent income (in logarithms) and very similar results were obtained. In any case, it must be noted that the size of the group of poor households which are not in a situation of multidimensional poverty is similar to the number of households that are not poor which find themselves in a situation of deprivation. Results are also unchanged

[9]The close link between mean income and well-being also appears when, instead of focusing our attention on the lower end of the income distribution, abbreviated social welfare function is used to verify the differences among regions (Ayala *et al*., 2006).

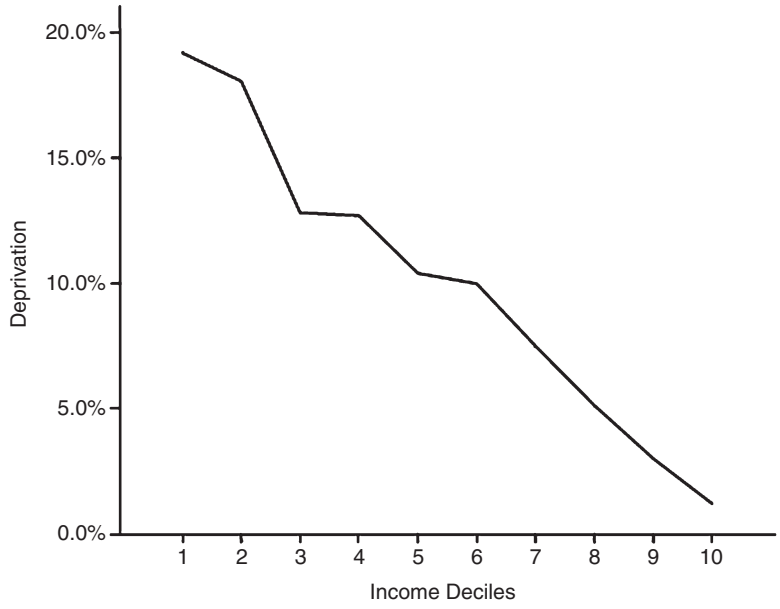

Figure 1. Distribution of Multidimensional Deprivation by Income Deciles
Source: Own elaboration from Spanish EU-SILC data (2005).

TABLE 2
Distribution of the Population According to Poverty and Multidimensional Deprivation
(% of total)

	Income Poverty (60% median, modified OCDE eq. scale)	
Deprivation	Poor	Not Poor
Deprived	7.19%	13.12%
Not deprived	12.04%	67.65%
	Income Poverty (30% median, modified OCDE eq. scale)	
Deprivation	Poor	Not Poor
Deprived	1.36%	19.15%
Not deprived	2.12%	77.37%
	Income Poverty (60% median, parametric eq. scale)	
Deprivation	Poor	Not Poor
Deprived	7.57%	12.94%
Not deprived	12.35%	67.15%

Source: Own elaboration from Spanish EU-SILC data (2005).

with alternative equivalence scales and the relative proportion of poor individuals who suffer multiple deprivation increases when lower poverty thresholds are used.

A more direct approach to find significant relationships lies in using suitable measures of statistical association.[10] If the most common statistics are used to explore the relationship between both variables, the same conclusion is reached.

[10]The chi-squared test, Cramer's "V," and Contingency coefficient are used because both variables (poverty and deprivation) are categorical. While the latter takes values between 0 (independence) and 1 (perfect relation), the second one ranges between –1 and 1, where 0 means independence, similarly to Pearson's correlation coefficient.

TABLE 3

Relationship between Poverty and Multidimensional Deprivation

	Pov 1	Pov 2	Pov 3
χ^2	1796433	321961	1985467
Cramer's "V"	0.207	0.087	0.216
Contingency coefficient	0.203	0.086	0.211

Notes: *All coefficients are significant at 5 and 1 per cent. Pov 1 uses 60% median, modified OCDE equivalence scale, Pov 2 30% median, modified OCDE equivalence scale. and Pov 3 60% median, parametric equivalence scale ($k = 0.7$).

Source: Own elaboration from Spanish EU-SILC data (2005).

Though some level of relationship does indeed exist, given that the hypothesis of independence is rejected, it is confirmed that such a relationship is not very significant. The respective coefficients are, in general terms, low (Table 3).

Once the relationship at a national level has been analyzed, the key question is whether or not regional differences exist. The search for aggregate relationships could be concealing the possible effect produced by the natural heterogeneity resulting from regional differences. Asymmetries in economic growth, wealth, and employment levels, along with differences in the patterns of demographic change or regional labor characteristics could be concealing the existence of very different effects of low income on living conditions. The aforementioned decentralization of some public services having a significant redistributive capacity and social assistance could also cause very different regional patterns of income and multidimensional poverty.

Heterogeneity is visibly manifested in the graphic representation of the distribution of multiple deprivation by income deciles in each region (Figure A1, Annex[11]). The trend is very similar concerning both the distribution by income deciles of each region (Figure A1(a), Annex) as well as when, as an alternative, each region's distribution of households by deciles is defined according to national income (Figure A1(b), Annex). The most outstanding feature is the remarkable lack of uniformity in the regional patterns. Though in most regions there seems to be a negative linear relationship between income levels and multidimensional deprivation, the profile is clearly decreasing in some cases while in others the trend is much more horizontal. Differences widen when the deciles are defined using national income.

As a result of this diversity, the statistical measures of association show a great variation among the regions (Table A1, Annex).[12] There does not appear to be a definite pattern of differences given that some regions with high poverty and deprivation rates are included within the group showing stronger relationships, which also includes regions with lower rates of both variables. This result does not considerably change with alternative equivalence scales or poverty thresholds but coefficients are reduced when lower poverty thresholds are used.

[11]The Annex can be downloaded from the online version of this article on http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1475-4991.

[12]The SIM dissimilarity index proposed by Dagum and Costa (2004) produced similar results. The SIM index is the proportion of individuals identified as poor according to the two criteria used in this paper: income and multidimensional deprivation.

4. Territorial Decomposition of Income Poverty and Multidimensional Deprivation

4.1. *Methodology*

The apparent absence of strong linear relationships between income poverty and multidimensional deprivation in the different regions suggests the need for a more detailed and thoroughgoing analysis of the roots of such divergences. A possible way lies in identifying whether or not both realities respond similarly to the households' different socioeconomic characteristics in each territory. The varying sensitivity of both phenomena to changes in the labor environment or to changes in household types could be the cause behind the differences observed in the relationships found for each region.

We examine regional disparities in poverty and multiple deprivation by adapting the decomposition technique of wage differentials initially proposed by Blinder (1973) and Oaxaca (1973). This widely known technique allows for the difference in average earnings between two groups to be decomposed into a component due to average differences in characteristics, and a component due to the way such attributes are rewarded in the labor market. This decomposition however cannot be applied directly because it was designed for linear regression models and our estimates of income and multidimensional poverty involve non-linear probabilistic models.

Prior research (Biewen and Jenkins, 2004; Bhaumik *et al.*, 2006; Gang *et al.*, 2006; Gradín, 2007) has confirmed that the difference between the poverty rates (P^0) of two groups, A and B, can be decomposed as follows:

$$P_A^0 - P_B^0 = \overline{F(X'_{iA}\beta_{iA})} - \overline{F(X'_{iB}\beta_{iB})} = \underbrace{\overline{F(X'_{iA}\beta_{iA})} - \overline{F(X'_{iB}\beta_{iA})}}_{characteristics} + \underbrace{\overline{F(X'_{iB}\beta_{iA})} - \overline{F(X'_{iB}\beta_{iB})}}_{coefficients} \tag{4}$$

where $P_j^0 = \overline{F\left(X'_{ij}\beta_{ij}\right)}$ is the headcount ratio of poverty in group j computed as the average probability of being poor in group j, X_{ij} is a set of sociodemographic and labor characteristics of individual i in group j, and β_{ij} is the corresponding vector of coefficients. The two terms in the right hand side of equation (4) could express the aggregate effect of regional differences in characteristics on the regional disparities of income poverty and multiple deprivation and the aggregate coefficients effect. The latter shows how the effects of the same characteristics change for regions. It could be possible to measure, for instance, if the divergences found among the regions are due to differences in human capital allocations or to differences in the regional labor markets.

Beyond these aggregate effects, it is possible to perform a detailed decomposition in order to evaluate the contribution of each variable or set of variables to the poverty disparities found. We follow the procedure proposed by Yun (2004) that generalizes Even and Macpherson's (1993) decomposition (see Annex). In short, this method determines the relative weight of each variable and coefficient and then applies these weights to the aggregate effects shown in the formula above.

In order to avoid identification problems caused by using binary variables, normalized regressions proposed by Yun (2005) are used to compute weights (see Annex).

4.2. *Results*

In order to test the differences in the components of income poverty and multidimensional deprivation in each region, the first step is estimating the corresponding *logit* models for each region and for the nation as a whole. By considering each one of the regions, the proposed relationships can be studied controlling the effects caused by unobserved variables. The *logit* models, being necessary as a starting point for the decomposition, also allow to sketch out a preliminary description of the determinants of the incidence of poverty and multidimensional deprivation.

The characteristics usually considered as relevant factors in the relative risk of belonging to the group of poor or deprived people have been chosen as explanatory variables. They include household characteristics, educational attainment, and labor market status. The household head's gender and age, household size, the number of children, and the type of household (single person, couples with or without children, single-parent households, and other households) are included among the first of these. This latter variable is represented through a set of dummies in which "single person" is the reference category. Educational and labor characteristics are highly relevant to explain household living conditions. Three dummies reflecting the highest level of educational attainment reached by the household's head are included—no studies, primary education, and higher education—whilst secondary education is taken as the category of reference. In addition, three variables are considered to reflect the labor market situation (part-time employment, unemployed, and inactive), taking full-time employment as reference. Lastly, the proportion of employed active adults is considered in order to take into account all the resources of the household, and not only those of the household's head.

Tables 4 and 5 show the results of the regressions for the two measures of income and multidimensional poverty. With the necessary caution derived from any possible problems concerning the sample representativeness in some regions, most of the coefficients appear with the expected signs. In the case of the income poverty indicator, education stands out among the different variables. Higher education has a strong and significant effect on the likelihood of being poor. At the other extreme, having an educational attainment equivalent to primary education or having no studies at all notably increases the risk of income poverty. These results are evident for both the national total and for most of the regions.

All the coefficients related to the labor market are significant for the nation as a whole and most have the expected signs. The effect exerted by the household head being in part-time employment stands out. This situation increases the risk of suffering poverty more than unemployment or inactivity. Being in part-time employment as the main source of income can lead to a worse situation than that of households dependent on social transfers. These results are repeated in most of the regions, though there are some variations. Unemployment is a more important risk for poverty than inactivity in some regions, such as Asturias, the Balearic

TABLE 4

LOGIT MODEL RESULTS FOR INCOME POVERTY

	AND	ARA	AST	BAL	CAN	CANT	CLM	CYL	CAT	CV	EXT	GAL	RIO	MAD	MUR	NAV	VAL.	**TOTAL**
Age of HH	0.0017	0.0349*	−0.0130	−0.0007	−0.0026	0.0262*	−0.0195*	0.0319*	0.0100	−0.0180*	0.0130	0.0075	0.0079	−0.0122	−0.0253*	−0.0542*	−0.0550*	−0.0045*
HH female	0.1616	0.7469*	1.0886*	0.5678*	−0.3467*	0.5055	0.2196	−0.1646	0.5283*	0.5054*	0.0503	0.2005	−0.2983	−0.0477	0.6853*	0.6993*	0.0190	0.1834*
HH no studies	0.6172*	1.5994*	0.2173	1.1368*	0.0705	−0.3787	1.8336*	1.7093*	1.2464*	0.0173	1.0825*	1.1034*	0.9346	2.2555*	1.7046*	1.6500*	0.8570	1.1880*
HH with primary edu.	0.2198*	0.2827	0.1537	0.3149	0.2885	0.4052	0.6972*	0.8788*	0.6965*	0.2911*	0.8531*	0.8301*	0.8787*	1.0716*	0.9386*	1.2315*	0.6875*	0.5960*
HH with higher edu.	−1.3032*	−1.2148*	−0.4031	−0.8264*	−1.1267*	−1.2854*	−1.1491*	−0.4388*	−1.3518*	−0.4204*	−1.8866*	−0.9165*	−1.5823*	−0.8724*	−0.3407	0.1041	−1.4675*	−1.0255*
Household size	−0.1453*	0.4358*	−0.5601*	0.3073	−0.2317	0.1530	0.2673*	0.2842*	0.2428*	−0.0832	0.3481*	0.0378	0.9336*	−0.1774*	−0.4819*	−0.0124	−0.6068*	0.0091
Number of children	0.5730*	0.3533	0.4970*	0.2034	0.6244*	0.5979*	0.1769	0.1157	0.6369*	0.4909*	0.6500*	0.4026*	0.1353	0.5083*	1.0748*	0.1501	1.1659*	0.4468*
Proportion of active adults	0.6726*	−2.0342	0.9425	−0.5244	0.6594	−0.0754	−1.4118*	0.4105	0.8183	0.0183	−1.1444*	1.2691*	0.3312	1.0044*	0.3928	−1.7506	2.7006*	0.7017*
Proportion of employed adults	−2.4419*	1.6500	−2.0902	−1.8899*	−2.7085*	−0.7378	−0.9793	−0.9831*	−1.4919*	−1.7446*	−1.3978*	−1.6601*	−1.9784*	−5.4016*	−4.3260	0.1784	−4.3832*	−2.3261*
HH in full-time employment	1.4311*	2.2035*	2.0435*	1.6127*	1.6554*	0.2131	0.9755*	1.7315*	1.3491*	0.5481	0.8749	0.7686	2.2969*	0.0000*	3.7451	−0.0823	1.6421*	1.2239*
HH unemployed	0.3743*	1.0343	2.5138*	1.3863*	0.2346	0.9365*	0.7050*	0.7941*	0.3634	0.5810*	1.6201*	−0.5124	1.8269*	−0.8102	0.5658	−0.6292	−2.1978*	0.2517*
HH inactive	0.5984*	0.2266	0.9907*	−0.3741	0.6218*	−1.9157*	1.4778*	0.0906	0.5732*	1.1139*	0.0944	0.9689*	1.8024*	−0.8403*	0.5670*	1.5079*	2.6409*	0.5612*
Couples w/out children	−0.1735	−0.5407	0.7576*	−0.9804*	−0.0995	−2.6513*	0.8382*	−0.9669*	−0.8594*	−0.3697	−0.8608*	−0.9756*	−2.3002*	−0.6914	−0.7959*	−0.1656	−0.5546	−0.5247*
Couples with children	0.4489*	−0.7781	2.0999*	−0.8054	−0.0607	−3.7533*	1.4659*	−0.5327	−1.1238*	−0.0183	−0.5229	−0.0364	−1.4749*	0.5259	0.3893	0.2086	0.4890	−0.0423
Single-parent households	0.4723	−0.9848	1.1461	−0.3858	0.6122	−3.0207*	2.3460*	−1.7523*	−0.0627	0.0808	3.8096*	0.8933	0.8385	1.9037*	1.4210	1.4150	0.8669	0.5153*
Other households without children	0.0626	−1.4794	1.0351	−1.3038*	−0.2548	−3.0960*	−0.3380	−1.2493*	−1.3559*	−0.3320	−1.3562*	−1.3895*	−3.7423*	0.0789	1.2214*	−1.3700	−0.9423	−0.6238*
Other households with children	0.1866	−2.9460*	2.3536*	−1.2775	0.5333	−3.0230*	0.2966	−1.2024*	−2.0451*	−0.0284	−1.9069*	−0.5149	−3.7782*	−0.9892	1.0762*	−0.4055	1.7474	−0.4716*
Constant	−0.8216*	−4.1884*	−1.4004*	−0.6497	0.2436	−0.4063	−1.3761*	−3.2438*	−2.8059*	−0.1392	−1.2767*	−2.2906*	−2.9884*	0.5591	1.2401*	0.3198	0.9518	−0.9544*
Number of observations	4,829	1,563	1,596	1,364	1,859	950	2,013	2,437	3,724	2,995	1,625	2,716	1,150	2,243	1,755	1,195	1,795	36,678
Wald test	621.11	197.81	150.27	162.56	242.62	116.73	367.47	222.75	377.96	275.61	307.91	301.33	145.26	303.33	324.44	98.33	256.47	3,099.92

Note: *Significant at 5%.
Source: Own elaboration from Spanish EU-SILC data (2005).

TABLE 5

LOGIT MODEL RESULTS FOR MULTIDIMENSIONAL DEPRIVATION

	AND	ARA	AST	BAL	CAN	CANT	CLM	CYL	CAT	CV	EXT	GAL	RIO	MAD	MUR	NAV	VAL.	**TOTAL**
Age of HH	−0.0250	−0.0668*	−0.0555*	−0.0324*	−0.0057	−0.0932*	−0.0359*	−0.0435*	−0.0310*	−0.0192*	−0.0258*	−0.0297	−0.0417*	−0.0431	−0.0334*	−0.1001*	−0.0303*	−0.0300*
HH female	0.1156*	0.2288	0.6613*	0.6870*	−0.3228*	−0.5310	0.2293	0.2769	0.4721*	0.2206	−0.0012	0.4703	−0.3679	−0.3944	−0.0937	0.4989	−0.0839	0.1262*
HH no studies	0.6881	2.4582*	1.8857*	2.7280*	0.9115*	0.0000*	1.3502*	2.5329*	0.9278*	1.0687*	0.0899	0.8773	2.8779*	1.8110	1.6034*	2.8194*	1.3793*	1.2411*
HH with primary edu.	0.4068	0.2184	0.2116	0.8476*	0.0925	1.1710*	0.8268*	1.6087*	0.6220*	0.2552*	0.1358	0.6920	1.7370*	1.2295	0.5120*	0.5898	0.1070	0.5683*
HH with higher edu.	−1.0560	−2.4084*	−1.4738*	−1.1048*	−1.7802*	−1.8502*	−1.2272*	−0.3646	−0.6703*	−1.1213*	−0.5912*	−0.6739	0.1263*	−0.7091	−0.5440*	−0.8856*	−0.8467*	−0.9175*
Household size	0.1170	−0.0216	−0.1580	−0.1089	0.0320	0.5610*	0.1507	−0.1598	0.3313*	0.2390*	0.1868	−0.1190*	0.0204	0.0443*	−0.2528*	−0.8739*	0.1909	0.0774*
Number of children	0.1191*	0.6465*	0.6456*	0.7965*	0.3639*	0.4568*	0.2439	0.1286	0.2254*	0.1907*	0.4813*	0.4592	1.3680*	0.2032*	0.6781*	1.7721*	−0.0047	0.2617*
Proportion of active adults	0.8677	−1.6904	1.5722*	2.1868*	2.6462*	3.3891*	0.1223	1.9671*	1.0043*	0.7521*	0.6483	1.5482	2.4326*	0.7498*	1.4649*	2.9411*	0.7320	1.2662*
Proportion of employed adults	−1.1496	−0.1039	−1.5459*	−2.2291*	−3.8072*	−2.7806*	−0.2869	−2.7818*	−1.9814*	−1.3074*	−0.7967	−3.1708	−1.9103*	−0.2243*	−0.7706	−4.0853*	−2.0211*	−1.7403*
HH in full-time employment	0.5810	0.6954	0.4157	0.0177	0.8429*	1.7426*	0.7908	0.7912	0.2841	0.6257*	1.6117*	1.6869	1.1918*	−0.7654*	−0.2294	−3.4005*	0.4327	0.4269*
HH unemployed	0.5266	1.3152*	0.1902	1.2354*	−0.6787*	−2.3804*	1.8932*	−1.2610*	0.2575	0.4095	0.3706	0.2856*	1.3488*	0.8335	0.8482	1.2146*	−0.1648	0.3118*
HH inactive	0.6284	0.4710	0.8196*	−0.3406	−0.5818*	1.8143*	1.1039*	0.5329	−0.5000*	−0.0057	0.6103	0.1225*	−0.0964	0.9187	1.0975*	−0.6586	0.1651	0.2853*
Couples w/out children	−0.2310*	0.4582	−1.1067*	−0.1735	0.2260	−1.0215	−0.3803	−0.5703	−0.5458*	−1.1478*	0.1798	−0.4348	−0.4833	−0.6289*	0.1948	−1.9856	−1.4268*	−0.4691*
Couples with children	−0.2756*	−0.4665	−1.5995*	−1.4182*	−0.6100	−5.0440*	−0.4778	−0.4951	−1.7382*	−1.3806*	−1.3264*	−0.8284*	−3.4053*	−0.7433*	−0.9710*	0.1528	−1.3985*	−0.8779*
Single-parent households	−0.6114*	1.1736	−0.2150	−0.0401	0.7513	−0.9565	1.4375*	1.4395*	−0.5449	0.2678	−0.0452	0.7207	−0.8255	2.0339	−0.3448	−0.0348	−0.7664	0.3382*
Other households w/out children	−0.2191*	0.4622	0.0092	0.1015	0.5085	−2.3355*	0.0073	−0.1370	−1.0701*	−0.8562*	−0.3649	−0.1579	−0.4983	−0.8493*	0.4376	0.2842	−1.4446*	−0.4108*
Other households with children	−0.4115*	−0.3921	−2.0650*	−0.2580	−0.2268	−3.2446*	−0.6316	0.2002	−1.5614*	−1.0514*	−1.0670	−0.1142	−2.3159*	0.0321*	0.8619	4.1344	−1.8772*	−0.5212*
Constant	−0.2777*	1.7173	1.4706*	−0.0742	0.1359	1.2839	−0.9086	0.1837	0.1400	−0.0372	−0.0813	1.0378*	−1.0653	−0.0510*	−0.2268	0.3198*	0.7171	0.1043
Number of observations	4,829	1,563	1,596	1,364	1,859	950	2,013	2,437	3,724	2,995	1,625	2,716	1,150	2,243	1,755	1,195	1,795	36,678
Wald test	324.83	171.96	151.18	165.84	289.37	130.98	208.75	211.74	263.02	218.55	121.05	305.70	144.71	174.50	155.73	184.66	101.34	1,889.77

Note: *Significant at 5%.

Source: Own elaboration from Spanish EU-SILC data (2005).

Islands, Castilla y León, or Extremadura. Therefore, it does not turn out to be a surprise that poverty is negatively related to the proportion of employed adults in the household. Having the greatest possible number of household members in employment constitutes the best guarantee of success against poverty for both the nation as a whole, as well as for most regions. The variable corresponding to the proportion of active household members also has a positive effect in the country and in most of the regions.

Household composition and other demographic characteristics, such as the household head's gender and age, do not follow such a clear pattern. Although they turn out to be generally significant and with the expected signs for the nation as a whole, the same cannot be said for the regional models. While the number of children turns out to have a positive and significant effect in 11 of the 17 regions, the effect of being a single-parent household is only significant in five regions and, what is more, with mixed signs.

The results for multidimensional deprivation show some divergences as compared to this pattern, especially in the case of the regional models (Table 5). The national model is very similar to the one obtained for income poverty in terms of significance (all coefficients are significant), signs, and magnitudes. This similarity in the national aggregate conceals, however, considerable differences in some regional coefficients. In some regions—such as Andalusia, Castilla-La Mancha, Castilla y León, Extremadura, and Galicia—the number of significant effects falls, while in other regions—Navarre—the changes are just the opposite. In several cases, equivalent characteristics would therefore be associated to different levels of poverty and multidimensional deprivation in each region. Consequently, these differing results could at least partially be the cause behind the weak relationship found between income poverty and multidimensional deprivation.

The decomposition proposed in (4) can be used to analyze the discrepancies between the regional rates and the national rate:

$$P^0_{REG} - P^0_{NAT} = \overline{F(X'_{iREG}\beta_{iREG})} - \overline{F(X'_{iNAT}\beta_{iNAT})}, \tag{5}$$

where groups A and B correspond, respectively, to each of the regions and the national aggregate. This method allows decomposition of the observed discrepancies taking into account both the influence of the regional distribution of factors and characteristics and the specific features of the regions. An example of the former could be the higher risk of poverty in regions having lower educational attainment or a higher unemployment rate. The latter could come about, for instance, when the reducing effects of educational attainment on the risk of poverty differ among the regions. To sum up, the decomposition provides a general answer to the dilemma of attributing the responsibility of both phenomena either to personal or to the environmental characteristics. This is not a minor question since possible improvements in the design of policies to combat poverty and social exclusion would depend on the response.

The results of the decomposition of the differences between the regional and the national rates of income poverty and multidimensional deprivation are shown in Table 6. The most outstanding result is the greater importance in both cases of the "coefficients component" as compared to the "characteristics component." Regio-

TABLE 6

Decomposition of Income Poverty and Multidimensional Deprivation Differences

	Poverty			Deprivation		
	Difference	Characteristics	Coefficients	Difference	Characteristics	Coefficients
Andalusia	0.0744	0.0428*	0.0316*	0.0714	0.0356*	0.0358*
Aragon	–0.0307	–0.0016*	–0.0291*	–0.0861	–0.0231*	–0.0629*
Asturias	–0.0435	–0.0119*	–0.0316*	–0.0769	–0.0216*	–0.0553*
Balearic Is.	–0.0272	–0.0359*	0.0086	0.0009	–0.0020*	0.0028
Canary Is.	0.0874	0.0234*	0.0640*	0.1659	0.0400*	0.1258*
Cantabria	–0.0467	0.0069*	–0.0536*	–0.1180	–0.0095*	–0.1085*
C-La Mancha	0.0949	0.0280*	0.0670*	–0.0335	0.0062*	–0.0396*
Castilla y León	0.0538	0.0201*	0.0337*	–0.0715	–0.0026*	–0.0689*
Catalonia	–0.0699	–0.0170*	–0.0529*	–0.0371	–0.0189*	–0.0182*
Valencia.	0.0042	–0.0051*	0.0093*	0.0074	–0.0150*	0.0223*
Extremadura	0.1540	0.0565*	0.0975*	0.1049	0.0248*	0.0801*
Galicia	–0.0033	0.0077*	–0.0109*	0.0466	0.0098*	0.0368*
La Rioja	–0.0042	–0.0241*	0.0199*	–0.1156	–0.0210*	–0.0946*
Madrid	–0.0772	–0.0241*	–0.0530*	–0.0539	–0.0481*	–0.0058
Murcia	0.0555	0.0155*	0.0400*	0.0406	0.0361*	0.0045
Navarre	–0.0983	–0.0202*	–0.0780*	–0.1376	–0.0188*	–0.1187*
Basq.Country	–0.0989	–0.0213*	–0.0775*	–0.1016	–0.0130*	–0.0885*

Note: *Significant at 5%.
Source: Own elaboration from Spanish EU-SILC data (2005).

nal differences in the effects of these characteristics seem to contribute more than the divergences in their regional distribution. Although the size of the respective values changes, the regions having greater differences when compared to the national poverty and multidimensional deprivation rates—like Andalusia, the Canary Islands, and Extremadura—show a greater contribution of the "characteristics component." We could therefore affirm that the greater levels of poverty and deprivation in such regions are, to a large extent, due to their different original situation.

In any case, the most relevant results are those related to the contribution of household sociodemographic characteristics, educational attainment, and labor market status (Tables 7 and 8). These results suggest that poverty and multidimensional deprivation are distinct phenomena that follow a different pattern. In some regions, the contributions of the effects change in magnitude depending on whether poverty or multidimensional deprivation are being analyzed, while in others they even take opposite signs. Lastly, reference should be made to the contribution made by other unobserved variables that are considered through the model's constant term, which are more relevant in general terms to study differences in poverty than in deprivation rates. In short, the decomposition confirms the dependence of both processes on different determinants in each region. Differences in each territory's economic and social structure—as shown by the weight of the "coefficients component" in several regions—contribute to the unequal relationship observed between the two phenomena that have been the subject of this study.

5. Conclusions

Traditional studies on poverty based on a strictly income-based approach have been placed into question in recent years by different proposals that

TABLE 7

Decomposition of Income Poverty Differences

	Demographic		Employment Situation		Educational Attainment	
	Charac.	Coeff.	Charac.	Coeff.	Charac.	Coeff.
Andalusia	0.0414*	–0.0008	0.0002*	–0.0249	0.0012*	0.0102
Aragon	–0.0016*	0.4837*	0.0000	0.0218	0.0000	–0.0139
Asturias	–0.0420*	–0.1900*	0.0296*	–0.0364	0.0005*	0.0161*
Balearic Is.	0.0032*	0.0963*	–0.0376*	–0.0906	–0.0015*	0.0019
Canary Is.	0.0082*	–0.0798*	0.0086*	–0.0500	0.0066*	0.0339*
Cantabria	0.0030*	0.2890*	0.0003*	0.0634	0.0036*	0.0550*
C-La Mancha	0.0018*	0.0046*	0.0091*	–0.0927	0.0170*	–0.0194*
Cast. y León	0.0054*	0.2893*	0.0021*	0.0218*	0.0126*	–0.0075*
Catalonia	–0.0013*	0.1514*	–0.0092*	0.0556	–0.0064*	–0.0028*
Valencia	0.0008*	–0.0462*	–0.0078*	–0.0011	0.0019*	0.0123*
Extremadura	0.0079*	0.2922*	0.0217*	–0.1411	0.0268*	0.0156*
Galicia	–0.0078*	0.0521*	0.0094*	0.0864	0.0061*	0.0041*
La Rioja	–0.0269*	–0.1490*	–0.0130*	0.0300	0.0157*	–0.0049*
Madrid	0.0034*	–0.0564*	–0.0097*	–0.0549	–0.0178*	–0.0129*
Murcia	0.0120*	1.8515*	–0.0206*	1.5066	0.0241*	0.0424
Navarre	0.0008*	–0.3783*	–0.0037*	0.0503	–0.0173*	0.0014
Basq.Country	–0.0279*	–0.2220*	0.0261*	0.0323*	–0.0196*	0.0016*

Note: * Significant at 5%.
Source: Own elaboration from Spanish EU-SILC data (2005).

TABLE 8

Decomposition of Multidimensional Deprivation Differences

	Demographic		Employment Situation		Educational Attainment	
	Charac.	Coeff.	Charac.	Coeff.	Charac.	Coeff.
Andalusia	0.0344*	0.0032*	–0.0002*	0.0042*	0.0014*	–0.0066*
Aragon	–0.0233*	–0.1375*	0.0004	–0.0737	–0.0002	–0.0184*
Asturias	–0.0249*	–0.1741*	0.0048*	0.0310	–0.0014*	–0.0180*
Balearic Is.	–0.0057*	–0.1363*	0.0018*	0.0846	0.0020*	–0.1047
Canary Is.	0.0033*	0.2430*	0.0207*	–0.0158	0.0161*	0.0195*
Cantabria	–0.0094*	–0.0970*	–0.0013*	0.1808*	0.0012*	0.0676*
C-La Mancha	0.0009*	–0.0012*	–0.0023*	–0.0495	0.0076*	0.0017
Cast. y León	–0.1489	–0.1997*	0.0319	0.0169*	0.1144*	–0.0141
Catalonia	–0.0034*	–0.2481*	–0.0109*	0.0717	–0.0046*	–0.0250
Valencia	–0.0167*	0.0625*	0.0082*	–0.0072	–0.0065*	0.0015*
Extremadura	0.0042*	0.1252*	0.0117*	–0.0252	0.0089*	0.0231*
Galicia	0.0407*	–0.0952*	–0.0205*	–0.1236*	–0.0104*	0.0139*
La Rioja	–0.0149*	0.0864*	–0.0060*	0.0346	–0.0001*	–0.0443*
Madrid	0.0106*	0.0119*	–0.0070*	–0.0149	–0.0517*	0.0025
Murcia	0.0194*	0.0150*	–0.0074*	–0.0084	0.0241*	0.0012
Navarre	–0.0023*	–0.1303*	–0.0059*	0.0069*	–0.0106*	–0.0074*
Basq. Count.	0.0344*	0.0601*	–0.0002*	–0.0519*	0.0014*	–0.0048*

Note: * Significant at 5%.
Source: Own elaboration from Spanish EU-SILC data (2005).

incorporate a multidimensional approach. This interest has also reached the policy decision-making sphere. The European Commission and several national governments have started to systematize a set of social well-being indicators that reflect this multidimensional notion of poverty.

The development reached by these new approaches, however, has not been enough to accurately identify the kind of relationship that exists between income and multidimensional deprivation. The literature dedicated to analyzing whether a low level of income also entails insufficient living conditions has increased considerably in recent years, placing into question the consistency of poverty estimates based on strictly income-based criteria. Although differences among countries exist, most of the empirical evidence points toward a certain level of statistical association between both measures, though the relationship is generally weak. This study has made an attempt to extend this line of research by incorporating two alternative elements: constructing synthetic deprivation indices through a latent class model; and analyzing the relationship between multidimensional deprivation and income poverty incorporating the heterogeneity that arises from differences among regions.

Our results confirm a weak relationship between both phenomena. The analysis of the regional rates shows that this result is not an exclusive characteristic of the national aggregate and that this phenomenon is reproduced in most of the regions. There are, however, differences among the regions and a definite underlying pattern of statistical association between both phenomena does not seem to appear in all territories.

The common way of considering the analysis of the relationship between deprivation and poverty from an aggregated standpoint could therefore conceal the existence of much more significant relationships in specific regions. In these cases, identifying a consistent core of poverty should contribute to more suitable policy designs targeted at the most disadvantaged individuals, especially in contexts like the Spanish one in which public intervention has been affected by a process of growing territorial decentralization. The results also show that educational attainment and the labor market exercise a marked influence on the risk of poverty and multidimensional deprivation. Attaining higher levels of employment in the household should lead to a reduction in the risk of suffering low income and deficient living conditions.

The last relevant result arises from the decomposition of the regional divergences involving the two situations under study. In spite of the fact that the characteristics of individuals and of the households in which they live are determining, differences exist among the regions as a result of their different social policies, the specificities of the regional labor markets, or the peculiarities of their productive structures. On the one hand, these differences could explain the lack of a relationship between the income poverty and multidimensional deprivation indices. On the other, the persistence of such differences should lead to enhanced co-ordination of some regional policies in order to ensure a certain level of equality.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Figure A1. Distribution of Multidimensional Deprivation by Income Deciles and Regions.
Table A1. Relationship between Poverty and Multidimensional Deprivation by Regions.

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