



Has the Great Recession Changed the Deprivation Profile of Low Income Groups? Evidence from Spain*

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Abstract

This paper analyses how the economic crisis has modified the relationship between income and material deprivation in Spain, one of the European countries most affected by the crisis. We show that the degree of overlap between low income and material deprivation has increased by around 50% from 2008 to 2012, even despite the offsetting effect of the reduction in the (relative) income poverty threshold. We demonstrate that the Great Recession has produced a significant recomposition of the poverty profile in Spain. Our findings underline the increasing role played by long-term unemployment and by differences in tenure status of households in predicting this overlap, four years after the bursting of the property bubble.

Keywords: Low income, poverty, material deprivation, poverty profile, Great Recession.

JEL Classification: D31, I31, I32

1. Introduction

Although sometimes are treated as equivalent, poverty definitions based on income and on standard of living indicators identify different individuals as poor. This «mismatch» poses problems when considering low income statistics from a social policy perspective, since families with similar incomes do in fact have different levels of deprivation. Used for a long time as the only benchmark to monitor progress in combating poverty, low income is now regarded at the European level as a mere indicator of «risk» of poverty, no longer as «poverty» itself. The definition of the new Europe 2020 poverty target, based simultaneously on low income, material deprivation and low work intensity indicators, represents a first attempt to combine these two approaches at the European level.

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On the other hand, a number of studies have demonstrated, for different periods and contexts, that material deprivation measures can be extremely useful to separate individuals and families who really experience economic shortages from those who, for different reasons, do not appear to be «poor» despite their low incomes (McKay and Collard 2004: 65). As recently illustrated by Hick using British data, households combining low income and material deprivation are also more likely to suffer from wider forms of multidimensional disadvantage, compared to those on low incomes (Hick 2014: 1100). These findings give empirical support to the «consistent» poverty measures currently included in official poverty statistics by some countries, as one of the possible routes to take advantage of direct indicators when analysing poverty¹.

This question is even more important at the current time, following several years of economic recession in a large part of the developed world. In many countries, the crisis appears to have had different effects upon income poverty and material deprivation, and little is yet known of the final impact of the macroeconomic shock on the overlap between the two phenomena and the concrete transmission mechanisms. Although a recession typically involves changes which could increase the match between low income and deprivation, as a rise in long-term unemployment, there also exist, as discussed later in the text, processes which can counteract the previous outcome. Moreover, the decrease in average family income, significant in many countries, may cancel out the rise in monetary poverty if the threshold is not «anchored», potentially affecting the degree of overlap between low income and deprivation². Some recent research shows that deprivation rose significantly more for lower than for middle or higher income groups in some, but not all, the European countries (Whelan, Nolan and Maître, 2015), so that low income and material deprivation relationship can have followed different patterns during the Great Recession.

This study aims to shed light on this issue, by investigating changes in the degree of overlap and its determinants in Spain over the recent period. Spain has been one of the European countries most affected by the crisis and is especially valuable as a case study. After a decade of strong economic growth with average annual rises in GDP well over 3%, growth rates became negative from 2009 on and the unemployment rate increased from 8% in 2007 to 26% in 2013, the second highest rate in the EU-28 after Greece. In addition, the decade before the beginning of the economic crisis was also a time of large increases in housing prices, fuelled by abnormally low interest rates and a remarkable migratory boom. As in the case of the United States, many families with insecure jobs and low salaries purchased a home, thereby taking out mortgage loans which became a significant economic burden after the recession.

In this paper, we use cross-sectional data from the Living Conditions Survey (LCS), the Spanish component of EUSILC, to analyse changes in the degree of overlap between low income and material deprivation over the period of crisis. We show that the two criteria have become closer in Spain after the Great Recession, even despite the offsetting effect of successive declines in the poverty lines used to delimit the poor. Relying on multinomial logistic regression models estimated for 2008 and 2012, we investigate cross-sectional correlates

of the probability of belonging to each of the four groups generated by combining low income and material deprivation before and after the crisis, highlighting the similarities, but also some significant changes, in the factors associated with the low income and material deprivation profiles.

The structure of the study is as follows. Firstly, a review is made of the factors which may affect the degree of overlap between low income and material deprivation and the potential sources of change following the onset of the crisis. Secondly, the source of the data and the main definitions adopted in the paper are described, paying especial attention to the «material deprivation» index, which is constructed in a way that avoids some limitations of the index currently employed by Eurostat. Thirdly, we describe recent trends in the overlap between low income and material deprivation, using data for the period 2008-2012. Fourthly, the results of the multinomial logistic model estimated using 2008 and 2012 data are presented and succinctly discussed. The study ends with some brief conclusions.

2. Literature review

From a theoretical perspective, there exist at least three groups of reasons which may prove significant when explaining the «mismatch» between income poverty and material deprivation, and whose importance has been confirmed in diverse contexts by previous literature. Firstly, there are potentially important economic resources beyond current income, whose availability affects the extent to which an episode of low income has effects on the level of material deprivation. Accumulated wealth, human capital, access to public services or informal family networks are obvious candidates. Home-owners have, according to diverse studies, levels of deprivation inferior to those living in rented accommodation, especially if the mortgage is totally paid off (Berthoud, Bryan and Bardasi, 2004; Nicholas and Ray, 2012; Figari, 2012; Perry, 2002; Fusco; Guio and Marlier, 2011). Such differences are a potentially important factor in Spain, due to the great predominance of owner-occupied dwellings and the intense rise in property prices and mortgage indebtedness in the period prior to the onset of the crisis. Similarly, human capital has also been shown to significantly reduce the probability of simultaneously suffering low income and material deprivation (i.e. «consistent» poverty), probably due to the ability of the education variable to summarize processes related to long-term command over resources (Figari, 2012; Berthoud and Bryan, 2011; Whelan, Layte and Maître, 2004).

Secondly, households may have different needs, which could be inadequately translated into the «adjusted» income indicator. Corrections of income to reflect needs are usually based on very simple equivalence scales which take into account household size, but not other sociodemographic factors which may increase or reduce expenditure needs. Similarly, geographical and urban/rural variations in the cost of living are often neglected, although they may be substantial in the case of important household expenditures, such as transport or housing (Tunstall *et al.*, 2013; Nicholas and Ray, 2012). In Spain, it has been shown that the

poverty map varies when account is taken of the regional differences in the cost of living (Ayala, Jurado and Pérez-Mayo, 2014). Poor health status, the number of dependent children or lone parenthood also tend to increase the risk of material deprivation, even after controlling for the «adjusted» income level of the household (Bárcena-Martín *et al.*, 2014; Fusco, Guio and Marlier, 2011; Dewilde, 2008; Ayllón, Mercader and Ramos, 2007; Layte *et al.*, 2001). A relative robust finding is the existence of a reverse relationship between age and material deprivation, with the elderly being much less deprived than expected according to their income levels (Figari, 2012; Muffels and Fouarge, 2004; Whelan, Maître and Nolan, 2007, among others).

Thirdly, but no less importantly, the deprivation indicators may be capturing dynamic aspects of poverty which are not adequately reflected in an income indicator whose standard reference period is the previous calendar year. Numerous empirical studies have found a greater correlation between long-term income or consumption and material deprivation, in comparison to current income (Meyer and Sullivan, 2013; Sullivan, Turner and Danziger, 2008; Berthoud, Bryan and Bardasi, 2004; McKay and Collard, 2004). On the other hand, transitions into and out of the labour market and employment insecurity can have a significant effect, independently of income, on the level of material deprivation, reflecting the economic vulnerability associated with the instability of the income flow (Ayala, Jurado and Pérez-Mayo, 2011; Ayllón, Mercader and Ramos, 2007; Layte *et al.*, 2001). Thus, contemporary material deprivation indicators would provide a relatively simple and cost-efficient way to study the outcomes of dynamic processes that otherwise would have to be analysed using longitudinal data.

Whatever are the variables which at a given time explain a specific pattern of overlap between low income and material deprivation, it is foreseeable that a prolonged period of recession entails changes which modify the initial situation. The most straightforward effect of a recession is, generally, the loss of jobs and the reduction or disappearance of the regular income sources on which the family economy of many households was based. At overall level, the most probable consequence is an increase in the at-risk of poverty rate, although the impact may vary depending on the income replacement mechanisms of a public or private nature available to families, as well as the intra-family distribution of unemployment (Pilkauas, Currie and Garfinkel, 2012; Ayala, Cantó and Rodríguez, 2011). It is important to qualify that, given that recessions usually entail a reduction in household median income, the increase in poverty may be of different magnitude depending on whether a «moving» or an «anchored» threshold is applied. In general, it is to be expected that economic downturns have clear effects upon «anchored» poverty and material deprivation, while the effects upon relative poverty can be mixed, depending largely on inequality trends. Recent European experience seems to confirm this idea (Chzhen, 2014; Duiella and Turrini, 2014; Natali *et al.*, 2014).

The impact of changes in employment upon material deprivation may vary depending on the strategies used by households to cope with economic shocks (Blundell, 2011). It is important to emphasise that the possibilities of cushioning the negative effects of a loss of income are usually lower in less affluent families, who do not have significant quantities of

savings or wealth, and greater in households which accumulate higher levels of capital, have better educational levels or own their homes (Casado, 2011). A decisive element in the scenario of the current crisis is the room for manoeuvre of families to adjust housing costs downwards. Also of great importance is the duration of episodes of unemployment, typically higher in recessionary phases, increasing the probability that households go through situations of persistent low income.

The increase in unemployment, especially that of long duration, the drop in income levels, the difficulties of adjusting housing costs downwards and uncertainty with regard to the future are all factors which make foreseeable an increase in the degree of overlap between low income and material deprivation. Nevertheless, aspects such as the decrease in the income level used as a threshold may limit this effect to a certain extent, as it can increase the size of the group facing material deprivation without having «low» income. Other compensatory elements to be taken into account may be the decreases in the prices of certain goods during the crisis (as has been the case of housing in Spain, following the bursting of the property bubble) or a downwards re-evaluation of «need» (McKnight, 2013). Therefore, it is essential to empirically analyse the effects of the crisis on the size and profile of the population combining low income and material deprivation, as well as on those groups who are poor using exclusively one of the two criteria. Recent research by Whelan and Maître (2014) of the Irish case shows that income poverty became less closely associated with material deprivation and economic stress in this country after the Great Recession, but a wider analysis focused on sixteen economically advanced European countries found highly diverse patterns in the rise of material deprivation by income class since 2008 (Whelan, Nolan and Maître, 2015).

3. Data, definitions and material deprivation index

The data used in this study come from the Living Conditions Survey (LCS), which is the Spanish component of the European Statistics of Income and Living Conditions (EUSILC). For the analysis presented here, we have used the cross-sectional user microdata files published by the Spanish National Statistical Office, covering the period 2008-2012. The first dataset reflects situation at a moment prior to the crisis, while the last covers the same set of variables after four years of deep economic recession. The 2012 survey is also the latest available which is fully comparable with pre-crisis data, since 2013 marks the start of the new LCS Base 2013 series, with a novel methodology to estimate household incomes partly based on administrative data. For this empirical analysis, we have relied on cross-sectional rather than longitudinal data, because our main focus is on exploring changes in the contemporary relationship between low income and material deprivation, the two main current European poverty measures. The underlying assumption is that contemporary material deprivation indicators are able to provide a fairly simple but reliable way to summarize the outcomes of dynamic processes causing current poverty, thereby offering a relatively cost-efficient

alternative to the use of longitudinal data³. All results are calculated taking survey design into account⁴.

The measurement of the degree of overlap between low income and material deprivation requires the selection of a measure of monetary poverty and an index representing the accumulation of deprivations. In this study, we use the conventional Eurostat definition of low income to evaluate the risk of monetary poverty, so that we can analyse the material wellbeing implications of the indicator which has the largest impact in the Europe 2020 poverty target in the Spanish case. According to this criterion, people is considered to have low income if they live in a household whose equivalised disposable income (after tax and transfers) falls below the at-risk-of-poverty threshold, which is set at 60% of the national median equivalised current disposable income. Around 22% of the population had incomes below this level in 2012, two points higher than in 2008. Although this is the basic definition used throughout the analysis, changes in the degree of overlap between low income and deprivation are also checked using an «anchored» threshold (taking 2008 as base year), in order to assess the impact of changes in median family income following the onset of the crisis.

In the case of material deprivation, our analysis takes as a starting point a subset of the material deprivation indicators available in EUSILC, but uses a deprivation index which deviate on some variables from the «severe material deprivation» measure used in Eurostat statistics. As is well known, this is defined as the lack of at least four elements from a list of nine indicators which include the impossibility of permitting oneself certain activities (a week's holiday away from home, heating the home sufficiently, eating meat or fish at least every second day), the existence of financial difficulties (not being able to avoid arrears, not being able to face unexpected expenses) and the lack, for economic reasons, of several consumer durables (telephone, television, washing machine and car).

Although this is the index currently included in the Europe 2020 strategy (together with low income and very low work intensity), it presents certain limitations which reduce its usefulness for the analysis of levels and changes in material deprivation in European countries. On the one hand, four of the nine indicators are consumer durables whose possession is highly generalised in Western Europe, to the point at which their enforced lack is very rare and of little empirical relevance. On the other hand, the inclusion of four durable goods reduces the sensitivity of the index to the economic cycle, given that the lack of this class of elements is only made clear at the moment of renovation, following a prolonged period of insufficient income. In fact, the percentage of families suffering from severe material deprivation did not reach in Spain the level of 5% until 2012, after four years of crisis.

These and other limitations of the current 9-item material deprivation euro-indicator have been analysed in detail by Guio, Gordon and Marlier (2012), who used the special 2009 material deprivation module to suggest guidelines for the required revision and update of the material deprivation variables by 2015. As a result, a new widened list of indicators is being collected in all countries since 2013 and will probably serve to support a new deprivation index. However, the

majority of these additional indicators are not available for the period 2004-2012, except as part of the special module of material deprivation which accompanied the 2009 survey.

The strategy followed in the present study is to employ an index which improves the properties of the Eurostat measure of material deprivation, within the limitation of not yet having available the widened list of variables. To do this we employ the principal tests of validity, reliability and suitability used in Guio, Gordon and Marlier (2012) and also in other previous studies undertaken for Spain (Ayala and Navarro, 2008), applying them to the list of indicators included in the LCS 2012.

We take as a starting point a set of eighteen indicators of diverse forms of material deprivation and household problems which are usually included in material deprivation indexes and are available in the Spanish Living Conditions Survey for the whole period, covering a range of basic activities, financial difficulties, durable goods, housing conditions and environmental problems (Table 1). All these variables are collected solely for the household as a whole, which requires the adoption of the hypothesis that they adequately describe the situation of its members. For the possession of consumer durables the habitual criterion is followed of considering that deprivation is suffered only by those who declare that they do not possess the good due to not being able to afford it, and not for other reasons.

As a result of applying the principal tests of validity, reliability and suitability to the data (Martínez and Navarro, 2015), we obtain a set of nine indicators meeting all the required conditions to be part of a material deprivation index, including irrelevant non-response rates. Table 2 displays two-parameter Item Response Theory (IRT) results for each of the items which successfully passed the tests.

Table 1
LIST OF MATERIAL DEPRIVATION ITEMS IN THE LIVING CONDITIONS SURVEY

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1. Cannot afford to face unexpected expenses
 2. Cannot afford to pay for one week annual holiday away from home
 3. Cannot afford to avoid arrears in mortgage or rent, utility bills or hire purchase instalments or other loan payments
 4. Cannot afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day
 5. Cannot afford a car
 6. Cannot afford a computer
 7. Cannot afford a telephone
 8. Cannot afford a TV
 9. Cannot afford a washing machine
 10. Absence of indoor flushing toilet for sole use of the household or bath or shower in the dwelling^a
 11. Cannot afford to keep home adequately warm
 12. Overcrowding^b
 13. Housing cost overburden^c
 14. Leaky roof, damp walls/floors/foundations or rot in window frames or floor
 15. Darkness, not enough day-light
 16. Suffer from noise from neighbours or from the street
 17. Suffer from pollution, crime or other environmental problems
 18. Suffer from crime violence or vandalism in the area
-

Notes:

^a To avoid redundancy problems, we combine the variables of lacking an indoor toilet and lacking a bath or shower in a single indicator, as proposed by Guio, Gordon and Marlier (2012).

^b According to Eurostat definition, a household is considered as overcrowded if it doesn't have at its disposal at least: i) one room for the household; ii) one room for each couple; iii) one room for each single person aged 18+; iv) one room for two single people of the same sex between 12 and 17 years of age; v) one room for each single person of different sex between 12 and 17 years of age; and vi) one room for two people under 12 years of age. In this analysis, we do not consider single households as deprived if they live in a studio with a bedroom not separated from the living room.

^c The housing cost overburden rate is the percentage of the population living in households where the total housing costs ('net' of housing allowances) represent more than 40 % of disposable income ('net' of housing allowances).

Source: Living Conditions Survey.

Table 2
TWO-PARAMETER ITEM RESPONSE THEORY (IRT) MODEL. RESULTS

Items	Severity parameter	Discrimination parameter	Standardized factor loading
Cannot afford to face unexpected expenses	0.316	3.785	0.9668
Cannot afford to pay for one week annual holiday	0.132	3.245	0.9556
Cannot afford to avoid arrears	1.772	1.965	0.8912
Cannot afford meat every second day	3.028	1.605	0.8487
Cannot afford a car	2.414	1.703	0.8623
Cannot afford a computer	2.198	1.802	0.8744
Cannot afford to keep home adequately warm	1.984	1.743	0.8674
Overcrowding	2.924	0.155	0.7559
Housing cost overburden	2.427	0.983	0.7009

Source: *Living Conditions Survey 2012 cross-sectional data, author's computation.*

The second column in the table shows the values of the severity parameter for each of the deprivation items selected. This parameter identifies the level of deprivation suffered by the person who responds positively to that deprivation item, that is to say, the probable severity of the deprivation experienced by a person who lacks the item. The third column gives the parameter of discrimination, which represents how well each indicator distinguishes between those who experience deprivation and those who do not. The last column reflects this information based on the correlation between the different items and the deprivation index.

The results show that the individuals who say that they cannot face unexpected expenses or cannot pay for one week annual holiday away from home are those who suffer the lowest level of deprivation (lesser severity). In turn, those who cannot afford a meal with meat, chicken, fish (or their vegetarian equivalent) every second day and those who live in overcrowded dwellings are likely to experience a more severe level of deprivation. This is consistent with recent findings by Deutsch *et al.* (2015), who show that, when households face economic difficulties, certain expenditures, such as holidays or furniture, tend to be curtailed first, producing a «deprivation sequence» which does not differ substantially between EU member states or social groups.

4. Basic descriptives

Table 3 shows the values of the nine indicators chosen to represent the concept of deprivation for the years 2008 and 2012. As can be seen, the majority of the indicators followed

an upward trend between 2008 and 2012 (the only exceptions were the two referring to the possession of consumer durables, which decreased their incidence).

Table 3
MATERIAL DEPRIVATION IN SPAIN, 2008 AND 2012

Items	2008	2012	%Δ 2008-12
Cannot afford to pay for one week annual holiday	0.362	0.466	29
Cannot afford meat every second day	0.022	0.026	17
Cannot afford to keep home adequately warm	0.059	0.091	54
Cannot afford to face unexpected expenses	0.299	0.421	41
Cannot afford to avoid arrears	0.082	0.109	33
Cannot afford a car	0.059	0.057	-3
Cannot afford a computer	0.089	0.066	-26
Housing cost overburden	0.101	0.143	42
Overcrowding	0.056	0.057	1
Material Deprivation (3+items)	0.169	0.231	36

Source: Living Conditions Survey 2008 and 2012 cross-sectional data, author's computation.

The last line of Table 3 shows the percentage of persons who can be considered as living in material deprivation, taking as threshold the existence of three or more material hardships. Following common practice in the «consistent poverty» literature, this threshold has been chosen to delimit a population group similar in size to that derived from applying the relative poverty criterion, which facilitates the analysis of the overlap between the criteria of low income and deprivation.

Table 4 shows the percentages of the population having only low income (according to the conventional threshold of 60% of median income, adjusted by using the OECD modified equivalence scale), only material deprivation, low income and material deprivation, or neither of the two problems, over the period 2008-2012. There are some points that are worth highlighting. On the one hand, in any of the years considered there is a limited overlap between the two phenomena, which coincides with other studies undertaken to date (for example, Hick, 2014; Fusco, Guio and Marlier, 2011; Nolan and Whelan, 2011). On the other hand, there is a sharp increase in the degree of overlap during the crisis, so that in 2012 the percentage of persons responding to the profile of «consistent» poverty was 11.7%, approximately 50% greater than in 2008. This increase is larger, in relative terms, than that registered by the rate of low income and by material deprivation⁵. It is clear, therefore, that following four years of crisis the poor⁶ in Spain experienced greater levels of deprivation than at the onset of the recession. Or, in other terms, there are fewer and fewer poor whose low income is not linked to situations of material deprivation.

In parallel, the two groups which are disadvantaged according to only one of the two criteria have experienced a contrary evolution during the crisis: in 2012 there were fewer families with low income but without material deprivation than in 2008 and, in turn, more who suffered deprivation even with incomes above the threshold. This is important, since this last group has been found to have levels of multiple deprivation and wellbeing deficits somewhat lower than the «consistent» poor, but significantly higher than the «only low income» group (Hick, 2014; Nolan and Whelan, 2011).

Table 4
LOW INCOME, MATERIAL DEPRIVATION AND DISTRIBUTION OF THE POPULATION
ACCORDING TO THE OVERLAP BETWEEN THE TWO INDICATORS, 2008-2012

	Low income	Material deprivation	Overlap group				Overlap ratio
			None	Only deprivation	Only low income	Both	
2008	0.207	0.169	0.700	0.092	0.130	0.077	0.26
2009	0.201	0.203	0.687	0.112	0.110	0.091	0.29
2010	0.215	0.214	0.676	0.110	0.111	0.104	0.32
2011	0.222	0.201	0.684	0.095	0.116	0.106	0.34
2012	0.222	0.231	0.665	0.114	0.105	0.117	0.35
%Δ 2008-12	7	36	-5	24	-20	51	35

Note: The overlap ratio is obtained by dividing the number of people suffering low income and material deprivation by the number of people suffering low income or material deprivation.

Source: Living Conditions Survey 2008-2012 cross sectional data, author's computation.

As argued earlier, various factors may explain this evolution. Firstly, there must be taken into account the effects of the reduction of the poverty threshold itself, due to the declining median income during the crisis. This could have limited the increase in consistent poverty, by converting situations of «low income and deprivation» into situations of «deprivation without low income». This is coherent with the fact that the «only deprived» group is the profile with the second highest increase during the crisis (24%). The second possible effect of the reduction of the threshold, with different implications for the degree of overlap, is the crowding-out effect from poverty of persons who did not suffer material deprivation despite their low income and who following the crisis came to form part of the group of those having no disadvantage in either of the two fields. This may be the case of many pensioners, given the sharp decline in their relative poverty rate during the crisis. The reduction in the size of the group having only low income suggests that this explanation has also intervened in the Spanish case.

Table 5
LOW INCOME AND MATERIAL DEPRIVATION OVERLAP GROUPS IN 2012, MOBILE
VS. ANCHORED INCOME POVERTY LINES

Anchored poverty line	Mobile poverty line				
	Both LI & MD	Only MD	Only LI	Non-poor	Total
Both LI & MD	11.7	2.4	0.0	0.0	14.1
Only MD	0.0	9.0	0.0	0.0	9.0
Only LI	0.0	0.0	10.5	3.6	14.1
Non-poor	0.0	0.0	0.0	62.9	62.9
Total	11.7	11.4	10.5	66.5	100.0

Notes: The anchored poverty line is calculated as 60% of 2008 median household disposable income, updated to 2012 using the Harmonised Index of Consumer Prices. LI= Low income. MD= Material Deprivation. Non-poor= Nor low income nor material deprivation.

Source: Living Conditions Survey 2012 cross sectional data, author's computation.

The magnitude of the two effects can be evaluated by comparing the results obtained with the relative and «anchored» thresholds in 2012, taking LCS-2008 incomes as reference to calculate the second poverty line (Table 5)⁷. The comparison suggests that 14.1% of the population would have suffered low income and deprivation in 2012 if the poverty threshold had not been lowered, 2.4 points above the rate observed with the «moving» threshold. In parallel, 3.6% of the population considered «not poor» in 2012 using the relative threshold, would remain within the profile of «only low income» if the 2008 line had been maintained constant in real terms. Thus, the decrease in the threshold has generated, in net terms, a reduction of the rate of consistent poverty and of the ratio of overlap. The fact that consistent poverty has actually increased by somewhat more than 50%, despite the foregoing effect, reinforce the idea that the crisis has produced a genuine transformation in the link between low income and material deprivation, deteriorating the living conditions of the poor and intensifying the risk of social exclusion for those on the lowest rungs of income.

5. Results of the multinomial model

To analytically explore the change in the low income and material deprivation profiles following the Great Recession, a multinomial logistic regression model is estimated, at the onset of the crisis (2008) and four years later (2012), using data from the Living Conditions Survey. This type of model has been successfully employed to characterize the income poor and the materially deprived in some previous research (among others, Fusco, Guio and Marlier, 2011) for the European countries, or Ayllón, Mercader and Ramos, 2007) for Catalonia), although available results correspond to a period prior to the crisis and are based on different material deprivation measures⁸.

As categories of the dependent variable, consideration has been made of the four possibilities which delimit the two criteria proposed: (1) the individual is neither poor nor de-

prived; (2) he/she is deprived, but not poor; (3) he/she is poor, but not deprived, and (4) he/she is simultaneously poor and deprived. Groups 2 and 3, associated with the profiles of «only deprivation» and «only low income», are the most interesting categories to compare, since the differences in the profile of these two groups can help to clarify which factors «push» a household towards monetary poverty, but not towards deprivation, and vice versa. Consequently, one of these two categories has been chosen in the model, in particular the category of «only low income», as base category.

The characteristics used as predictors are the variables which, according to the theoretical framework presented before, can involve differences in the household resources and/or needs not reflected in current income, together with some basic sociodemographic features of the reference person. The predictors attempt to reflect the situation of the household as a whole even for variables collected at the individual level, such as educational level or gender. In such cases, the status of the household reference person (the member of the household who is responsible for the accommodation) has been attributed to all the household members. In the final model, the explanatory variables are housing tenure, low work intensity status, labour market position, type of contract in the current or previous job, existence of health-related limitations in daily activities, country of birth, educational level, sex, household type and population density of the area of residence. All the variables are categorical and the classes defined are shown in Table 6.

Results of the final model are summarized in the same Table. The first interesting result is that in both years the housing tenure status, the type of area of residence and the existence of health-related limitations in daily living are identified as the main discriminant factors between the low income groups and the materially deprived. Having a mortgage or paying rent, residing in densely populated areas or having physical limitations are circumstances which increase the risk of material deprivation more than the risk of having low income, compared to those whose dwelling is fully paid for, reside in less populated areas or are healthy, regardless the income level and controlling for the remaining explanatory variables. This result is in line with theoretical expectations with regard to the mismatch between low income and material deprivation, as well as with previous evidence, as shown in the literature review presented before.

Housing tenure is, of the three mentioned, the variable with the greatest impact both at the beginning of the crisis, 2008, and, even more clearly, in 2012, after four years of recession. Particularly, having to make rental payments has in 2012 a significantly⁹ greater impact on the probability of suffering material deprivation, combined or not with low income. On the other hand, mortgage payments increase significantly more in 2012 than in 2009 the odds of belonging to the consistent poverty group. This greater quantitative impact of tenure status in the post-crisis scenario is an important finding with relevant policy implications. The ability of households to confront a negative income shock as strong as that resulting from the current economic crisis is conditioned by their net wealth level and their possibilities of obtaining liquidity from property assets in case of necessity, two aspects which have undergone a serious deterioration as a result of the crisis.

Together with housing-related costs, the existence of limitations in daily activities because of health problems is more closely associated to situations of material deprivation than to those of low income. Furthermore, in 2012 having limitations due to health problems significantly increases also the probability of combining low income and deprivation, in comparison with healthy individuals. As in the case of housing costs, this variable may be considered as associated to additional expenditure needs not taken into account in the income indicator, which would imply a greater risk of deprivation for similar income levels. Also, residing in an urban dwelling (a densely populated zone) is linked to higher odds of material deprivation than of low income, compared to those living in less populous areas, both at the beginning of the crisis and four years later -although in this case the probability is significantly lower in 2012 than in 2008.

A second important finding is that although there exists a strong relationship between labour market categories and the probability of having low income, these variables do not always have the same impact in terms of material deprivation, and some of the profiles most closely associated to deprivation are precisely the ones which have grown rapidly with the crisis. Low work intensity of the household, one of the three indicators selected in the Europe 2020 Strategy to identify the risk of poverty or social exclusion, increases significantly more the probability of combining low income and deprivation than that of having only low income, in 2008 and 2012. It is also interesting to stress some differences related to the duration of unemployment: in both years, the newly unemployed are less likely than the employed to belong to the group of the «non-poor», but they are not clearly concentrated in any of the three risk profiles. In contrast, the long-term unemployed are more concentrated (especially in 2012) in the «consistent poor» group. The temporary nature of the previous or current job, a factor also identified as significant by Ayllón, Mercader and Ramos, (2007) in their analysis of Catalonia, makes it more likely to live in consistent poverty than to be «non-poor» or to have only low income or only deprivation, both at the beginning of the crisis and four years later.

Table 6
MULTINOMIAL LOGISTIC REGRESSION RESULTS. LOG ODDS RATIOS
AND SIGNIFICANCE LEVELS

Variables	2008			2012		
	Neither poor nor deprived	Only deprived	Poor and deprived	Neither poor nor deprived	Only deprived	Poor and deprived
Sex of reference person						
<i>Male</i>						
Female	1.41***	2.03***	1.15	1.48**	1.68***	1.24
Household Type						
<i>2 adults, no dependent children, both <65</i>						

Variables	2008			2012		
	Neither poor nor deprived	Only deprived	Poor and deprived	Neither poor nor deprived	Only deprived	Poor and deprived
2 adults, no dependent children, at least one >65	0.55***	0.41**	0.61*	0.72*	0.65*	0.44**
One person household <65	0.45***	0.93	1.23	0.50**	0.72	0.81
One person household >65	0.33***	0.25***	0.80	0.90	0.92	0.45**
Other households without dependent children	1.50**	1.97**	0.97	1.03	1.15	0.66
2 adults, one dependent child	0.56**	0.71	1.24	0.52***	0.60**	0.84
2 adults, two dependent children	0.24***	0.20***	0.73	0.31***	0.25***	0.76
2 adults, three or more dependent children	0.11***	0.10***	1.75*	0.13***	0.24***	0.68
Single parent household, 1+ dependent children	0.20***	0.53	2.26**	0.33***	0.58	1.79*
Other households with dependent children	0.59**	1.07	1.95**	0.41***	0.80	1.12
Country of birth of reference person						
<i>Spain</i>						
Rest of Europe ^a	0.41***	1.21	1.24	0.63	0.53	1.94*
Other countries	0.42***	1.79**	2.18**	0.27***	0.86	1.16
Highest ISCED level of reference person						
<i>Tertiary education</i>						
Upper secondary education and post-secondary	0.67**	1.31	1.36	0.49***	1.09	1.39
Lower secondary education	0.44***	1.46*	1.47	0.28***	1.04	2.09**
Primary education	0.32***	1.38	1.59*	0.22***	1.01	2.47***
Pre-primary education	0.22***	1.80**	3.45***	0.21***	1.71*	5.29***
Very low work intensity status of household						
<i>No</i>						
Yes	0.22***	0.43***	1.95**	0.17***	0.33***	1.93***
N/A (aged 60 or over)	0.52***	0.46***	1.02	0.54***	0.51***	1.24

Variables	2008			2012		
	Neither poor nor deprived	Only deprived	Poor and deprived	Neither poor nor deprived	Only deprived	Poor and deprived
Employment status of reference person						
<i>Stable^b salaried worker, working full time</i>						
Stable ^b self-employed, working full time	0.10***	0.09***	0.38***	0.10***	0.10***	0.84
Stable ^b part-time worker	0.47**	0.51**	0.81	0.23***	0.33**	1.02
Working, job found last year	0.22***	0.31***	0.91	0.33**	0.45**	1.01
Unemployed for at least one year	0.18***	0.24***	0.93	0.27***	0.55**	1.88**
Unemployed, less than one year	0.27***	0.53*	0.91	0.35***	0.57*	1.60
In retirement	0.49***	0.54**	0.47**	0.89	0.79	0.79
Other inactive person	0.20***	0.20***	0.65	0.40***	0.41***	0.96
Reference person is/was a temporary worker	0.77**	1.23	2.13***	0.73**	0.95	1.47**
Housing tenure status						
<i>Outright owner</i>						
Owner paying mortgage	1.81***	4.76***	1.98**	1.96***	5.32***	4.72***
Tenant paying rent at market rate	1.02	4.08***	5.48***	1.27	7.70***	1.02***
Accommodation is rented at a reduced rate	0.84	2.37**	4.35***	0.84	3.59***	5.26***
Accommodation is provided free of charge	0.76*	1.61**	1.82**	0.74*	1.59*	2.90***
Live in a densely populated area	1.51***	1.85***	1.93***	1.44***	1.35**	1.60**
Health-related limitations of reference person	0.93	1.65**	1.20	1.08	1.81***	1.68**
Constant	58.17***	0.52**	0.10***	69.66***	1.17	0.09***

Notes: ^a Rest of EU-27 for 2012. ^b Labour status unchanged over the past year. Base category= Only low income. All results are calculated taking survey design into account. Parameter significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$. In 2008: Num. Observations: 35794; $F(96, 1957) = 22.12$; $Prob > F = 0.0000$. In 2012: Num. Observations: 33487; $F(96, 1914) = 22.27$; $Prob > F = 0.0$.

Source: Living Conditions Survey 2008 and 2012 cross sectional data, author's computation.

A third finding which should be underlined is the importance of the educational level of the reference person as an explanatory factor of consistent poverty. Having less than primary education is in 2008 a feature differentiating the consistent poor from those displaying only low income or only material deprivation. In 2012, the profile of the consistently poor reaches as far as those who have basic secondary education, being remarkable the worsening of households whose reference person has completed only lower secondary or primary school. The significance of this variable in a model which incorporates many other predictors of poverty is relevant, since it implies that a high level of education protects to some degree against the risk of belonging to the most vulnerable group (that of the consistent poor), even after controlling for other factors.

The last finding to be emphasised is the decrease in the explanatory weight of sociodemographic factors such as household type, age, gender or the origin of the reference person after four years of crisis, together with a certain rearrangement of the characteristics of risk. For example, elderly people living alone were significantly associated to a low income profile in 2008, but this association disappears in 2012. Equally, other households without dependent children were more linked to deprivation than to low income profiles in 2008, but not in 2012. It is interesting to note that the elderly have in 2012 a lower probability than non-elderly adults of combining low income and material deprivation, whether living alone or as part of a couple. This is coherent with results from other studies showing that in Spain, as well as in other countries, elderly people do not only show comparatively low material deprivation levels (Bárcena-Martín *et al.*, 2014), but also are the age group least affected by the crisis, probably due to their lower exposure to recent fluctuations in labour and property markets.

6. Conclusions

The Great Recession has caused important changes in the income distribution and living conditions of broad social groups. Spain belongs to the small group of countries whose unemployment rate more than doubled over the first four years of crisis, reaching values above 25% of the active population. Nevertheless, the impact of this economic shock upon the level and composition of poverty varies significantly according to the indicators adopted. The present paper has investigated this question by combining the perspectives supplied by the approach to poverty as low relative income, dominant in the European Union, and that of material deprivation, which also has a long tradition in some European countries. The study has assessed the effects of the crisis upon the degree of overlap between low income and material deprivation, with particular attention paid to the profile of the «consistent poor» and of those who display material deprivation despite not having low income, as opposed to that of households whose low income is not accompanied by situations of objective deprivation. To do this, previous definition has been made of an index of material deprivation that replaces some of the indicators currently employed by Eurostat by others whose enforced lack affects to larger parts of the population, apart from giving less weight to items not enough sensitive to the economic cycle. These configure an ag-

gregate index which presents adequate properties in terms of suitability, validity and reliability.

Our analysis has revealed some important changes in the structure of poverty in Spain over the recent period. On the one hand, the crisis has increased by 50% the percentage of persons who simultaneously suffer low income and material deprivation, reaching 12% of residents in 2012, compared to 8% in 2008. Although the degree of overlap between the groups delimited by these two criteria continues to be modest, the consistent poor have increased during the crisis at a greater pace than relative poverty and material deprivation taken separately. Moreover, it has been shown that the increase in the size of this group would have been greater if use had been made of a poverty threshold anchored at 2008 income levels, since the decrease in the poverty line has meant a certain reallocation from the group of the «consistent poor» to that displaying only material deprivation.

On the other hand, there have been some modifications in the poverty and deprivation profiles, following four years of crisis. Firstly, the effect of tenure status, which was already important in 2008, is reinforced in 2012, coming to constitute the main differentiating factor to discriminate between those who have «only low income» and those who suffer material deprivation. This result is especially important in Spain, a country notable for the small size and high prices of the rental market and the negative impact of the property bubble upon housing affordability for new households (principally young people and immigrants).

Secondly, long-term unemployment appears in 2012 as a significant factor of the consistent poverty profile. Four years after the start of the crisis, households headed by a person unemployed for at least twelve months have greater odds of simultaneously having low income and deprivation than of belonging to any of the remaining profiles. An important change is that this group of households, whose demographic weight has increased from 3% of the population in 2008 to 10% in 2012, has at the end of the period a significantly greater risk of deprivation than in 2008. It is worth to emphasise that the group of the consistent poor has increased not only due to the extension of unemployment, but also because unemployment is in 2012 more closely associated to situations of material deprivation than it was in 2008.

Together with unemployment and housing costs, the educational level of the reference person is a relevant explanatory factor of consistent poverty. It should be stressed that the economic crisis has significantly impacted on those households whose reference person has completed only lower secondary or primary education. Equally, the existence of health-related limitations in daily activities has in 2012 a significant effect on consistent poverty. These results confirm the idea that the economic crisis has not harmed all workers equally, but instead has struck more deeply those having a lower level of human capital and more fragile positions in the labour market at the end of the expansionary phase. In parallel, sociodemographic variables as gender, household composition or the urban/rural divide lose

explanatory weight as determinants of the pattern of overlap between low income and material deprivation following four years of crisis.

Finally, we wish to emphasise the usefulness of combining low income and material deprivation indicators in the monitoring of poverty. This study has shown that variations in the low income rate can seriously underestimate the effects of the economic crisis upon poverty, due to the downward adjustment of the threshold and to the possible changes in the relationship between low income and deprivation. The experience of Spain shows that the Great Recession has had sharper consequences upon material deprivation than upon low income levels, increasing the incidence of material poverty at a much faster pace than suggested by the statistics of the population «at risk of poverty». Furthermore, this process has been due not only to the increase in the demographic weight of the vulnerable groups because of the recession, but also to the greater impact of factors such as long-term unemployment or housing costs on material deprivation, after four years of crisis. Our work provide results which should be taken into account when redesigning the mechanisms of social protection for families of working age, in a country whose welfare state model has proved to be barely effective in mitigating the social impact of the crisis.

Annex

Table A.1
MULTINOMIAL LOGISTIC REGRESSION RESULTS ON POOLED DATA (2008-2012).
LOG ODDS RATIOS AND SIGNIFICANCE LEVELS

Variables	Neither poor nor deprived	Only deprived	Poor and deprived
Sex of reference person			
<i>Male</i>			
Female	1.32***	1.67***	1.26**
Household Type			
<i>2 adults, no dependent children, both <65</i>			
2 adults, no dependent children, at least one >65	0.67***	0.50***	0.57***
One person household <65	0.48***	0.79*	1.05
One person household >65	0.58***	0.49***	0.66**
Other households without dependent children	1.32***	1.51***	0.95
2 adults, one dependent child	0.58***	0.63***	1.06
2 adults, two dependent children	0.31***	0.28***	0.82
2 adults, three or more dependent children	0.15***	0.18***	1.32*
Single parent household, 1+ dependent children	0.20***	0.48***	1.73***
Other households with dependent children	0.62***	1.00	1.44**
Country of birth of reference person			
<i>Spain</i>			
Rest of Europe ^a	0.69**	1.16	1.62**
Other countries	0.41***	1.44**	1.90***
Highest ISCED level attained of reference person			
<i>Tertiary education</i>			
Upper secondary education and post-secondary	0.61***	1.21*	1.39**

Variables	Neither poor nor deprived	Only deprived	Poor and deprived
Lower secondary education	0.38***	1.39**	1.80***
Primary education	0.30***	1.41**	2.41***
Pre-primary education	0.20***	1.85***	3.58***
Very low work intensity status of household			
<i>No</i>			
Yes	0.22***	0.38***	2.16***
N/A (aged 60 or over)	0.57***	0.51***	1.11
Employment status of reference person			
<i>Stable^b salaried worker, working full time</i>			
Stable ^b self-employed, working full time	0.09***	0.08***	0.66**
Stable ^b part-time worker	0.30***	0.35***	0.98
Working, job found last year	0.28***	0.46***	1.00
Unemployed for at least one year	0.23***	0.50***	1.58**
Unemployed, less than one year	0.38***	0.81	1.60**
In retirement	0.58***	0.55***	0.65**
Other inactive person	0.28***	0.30***	0.82
Reference person is/was a temporary worker	0.70***	1.14*	1.52***
Housing tenure status			
<i>Outright owner</i>			
Owner paying mortgage	1.65***	4.35***	2.87***
Tenant paying rent at market rate	1.15	5.75***	6.97***
Accommodation is rented at a reduced rate	0.84	3.35***	4.64***
Accommodation is provided free of charge	0.81**	1.59***	2.06***
Live in a densely populated area	1.55***	1.71***	1.53***
Health-related limitations of reference person	0.93	1.63***	1.34***
Dummy 2009	1.24***	1.55***	1.31**

Variables	Neither poor nor deprived	Only deprived	Poor and deprived
Dummy 2010	1.16**	1.46***	1.47***
Dummy 2011	1.03	1.10	1.30**
Dummy 2012	1.06	1.40***	1.66***
Constant	51.56***	0.52***	0.07***

Wald test of joint significance of time dummy variables:

(H0: dummy 2009=dummy 2010=dummy 2011=dummy 2012=0)

F (12, 2147) = 6.43

Prob> F = 0.0000

Notes: ^a Rest of EU-27 for 2012. ^b Labour status unchanged over the past year. All results are calculated taking survey design into account. Parameter significance: * $p > 0.10$, ** $p > 0.05$, *** $p > 0.001$. Number of Observations: 177060; $F(108, 2051) = 65.57$; $Prob < F = 0.0000$.

Source: Living Conditions Survey 2008, 2009, 2010, 2011 and 2012 pooled cross-sectional data, author's computation.

Notes

1. «Consistent poverty» is usually defined as people simultaneously having low income (delimited according to some previously settled poverty line) and material deprivation (identified using some specific set of deprivation indicators). The concept was initially proposed by Nolan and Whelan (1996), as a way to achieve better coherence between theoretical definition and empirical measurement of poverty. The «consistent poverty» approach is not, however, the only way to combine income and deprivation indicators, with some authors favouring a separate analysis of the two spheres (Chzhen 2014; UNICEF 2012).
2. «Anchored» poverty lines are obtained by keeping the initial poverty threshold fixed in real terms over a certain time period. In contrast, «moving» poverty lines are typically calculated as a proportion of *current* median household income levels.
3. Of course, longitudinal data would provide a direct way of analyzing the joint dynamics of income and material deprivation, though they would also entail a significant reduction of sample size, apart from limiting the time span covered. The use of panel data would also allow for a better assessment of the lagged effect of income on material deprivation, suggested by previous literature. As stated by Fusco, Guio and Marlier, (2011) in their analysis of the links between income poverty and material deprivation, disposable income is only a partial measure of resources available to the household, so that it is to be expected a stronger link with «permanent income» than with «current» income. Moreover, the impact of income on material deprivation may not be immediate, which means that lagged income may have a greater influence than current income on contemporary material deprivation. These relationships have tended to be confirmed by panel data based empirical research (see among others Muffels and Fouarge, 2004; Berthoud, Bryan and Bardasi, 2004; McKay and Collard, 2004; Iceland and Bauman 2007; Sullivan, Turner and Danziger, 2008; Berthoud and Bryan, 2011; or Fusco, 2012).
4. The variables accounting for survey design have been programmed using the Stata *svyset* command, so standard errors estimates obtained are robust to the fact that we are dealing with a stratified two-stage sample in which individuals do not form independent units of observation, but are clustered within households. Given that the original stratification variable is missing in the user data files, due to confidentiality reasons, we have used the region of residence as a *proxy*, as suggested by Goedemé (2013).
5. It should be noted that the increases in the rate of material deprivation and that of «consistent» poverty between 2008 and 2012 prove significant for a confidence level of 95%, which is not the case for the increase in the relative pov-

erty rate. This conclusion is confirmed if we use the new LCS 2013 Base data files (not perfectly comparable with Base 2004 data) to draw 2012 results, even though changes are somewhat less intense.

6. To simplify, we employ the label «poor» to refer to persons with income below the threshold, without this implying that we share the identification between poverty and low income. The same caveat is applicable to the term «consistent poor», which we use frequently to refer to persons simultaneously showing low income and material deprivation.
7. The «anchored» poverty line is calculated as 60% of the initial median household disposable income, updated using the Harmonised Index of Consumer Prices. To make this adjustment, we have taken into account the fact that the LCS income data refer always to income obtained by the household during the calendar year prior to the interviews.
8. As a complementary analysis and sensitivity test, we have also run a multinomial logit based on the 2008 to 2012 five years pooled data, introducing time dummies and other variables. The results show that time dummies capturing the economic downturn actually matter in explaining the probability of belonging to a specific income/deprivation profile (see Table A.1. in Annex). An interesting result is that 2009, 2010 and 2012 dummies are linked to a greater probability of suffering problems of deprivation without low income, compared to the base result of low income without deprivation in year 2008. In the same vein, 2009, 2010, 2011 and 2012 increase the relative risk of belonging to the consistent poverty profile compared to the 2008's «only low income» base group. This makes sense since there are fewer and fewer poor in these years whose insufficient income is not linked to situations of material deprivation.
9. A Wald test has been used to contrast the statistical significance of differences in the coefficients in 2008 and 2012 regressions.

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Resumen

Este trabajo analiza la forma en que la crisis económica ha modificado la relación entre ingresos y privación material en España. Se encuentra que el grado de solapamiento entre los fenómenos de baja renta y privación material ha aumentado aproximadamente en un 50% con la crisis, a pesar del efecto compensatorio de la reducción del umbral de pobreza relativa. Se muestra cómo la Gran Recesión ha producido cierta recomposición de los factores de vulnerabilidad social en España. Los resultados ponen de manifiesto el creciente papel del desempleo de larga duración y de las diferencias en el régimen de tenencia de la vivienda en el solapamiento de ambos fenómenos, cuatro años después del estallido de la burbuja inmobiliaria.

Palabras clave: bajos ingresos, pobreza, privación material, perfil de pobreza, Gran Recesión.

Clasificación JEL: D31, I31, I32