The coupling of disadvantages:

Material poverty and multiple deprivation in Europe before and after the Great Recession

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Abstract

This paper examines the impact of the Great Recession on material poverty and multiple deprivation in Europe. Drawing on *Poverty as Capability Deprivation* (Hick, 2014), which is one specification of Amartya Sen's capability approach, as a conceptual framework, and employing the Alkire-Foster adjusted headcount measure, we present a multidimensional poverty analysis of twenty-four EU Member States at four time points: 2005, 2008, 2011 and 2013, drawing on data from the EU Survey of Income and Living Conditions. The analysis shows that the pre-crisis period was associated with substantial reductions in multidimensional poverty in Europe, with the largest reductions in the poorest Member States. However, the Southern European countries largely failed to benefit from these pre-crisis poverty reductions and then experienced the largest increases in multidimensional poverty in Europe when the crisis hit. These patterns reflect a changing geography of poverty within the European Union, increasingly concentrated away from the East, and towards the South.

1. Introduction

Understanding the impact of the Great Recession on poverty and living standards continues is a project of considerable importance. As the standoff in the lead-up to a third bailout package for Greece being agreed has recently demonstrated, the crisis is far from being behind us, in some nations at least. In this paper, we seek to explore the impact of the Great Recession in Europe in human terms, taking a broad view of the experience of poverty and deprivation in the period immediately preceding the crisis as well as in the period since 2008.

To do this, we present a multidimensional analysis of poverty and deprivation. The study of poverty has, in recent years, been undergoing a multidimensional turn, with a growing number of analysts embracing arguments in favour of adopting a multidimensional approach in order to understand poverty. This paper presents an analysis of multidimensional poverty in Europe which draws on *Poverty as Capability Deprivation* (Hick, 2014), which is a specification of Amartya Sen's capability approach for the purpose of analysing poverty. Moreover, it employs one recent advance in multidimensional poverty measurement, the Alkire-Foster (AF) measure, to analyse the experience of poverty and multiple deprivation in Europe. An important advantage of the AF measure is that it enables multidimensional poverty to be decomposed by its

constituent dimensions, thus allowing analysis showing how each dimension contributes to change in the multidimensional poverty.

The paper is structured in nine sections. In sections 2 and 3, we discuss the growing trend towards multidimensionality within poverty analysis, and *Poverty as Capability Deprivation,* the framework which informs the present analysis, respectively. This is followed by a discussion of the Alkire-Foster method in section 4. In section 5, we present a discussion of the data and dimensions which have been selected for the present analysis. In the sixth section we present analysis of material poverty and multiple deprivation in Europe. This analysis (a) explores the relationships between each dimension individually, (b) examines aggregate change in multidimensional poverty in the periods preceding and following the onset of the Great Recession and (c) decomposes these by dimension and by Member State. The seventh section presents sensitivity analysis, which is particularly important for multidimensional poverty analyses given the numerous decisions made by the analyst (Hick, 2015). In the penultimate section, we present some reflections on the Alkire Foster method itself, and in so doing seek to contribute to the literature on multidimensional poverty measurement. The paper concludes by summarising the key findings.

2. The multidimensional turn in poverty analysis

Poverty analysis has, in recent years, been undergoing a multidimensional turn. This reflects a growing belief that the analysis of poverty needs to extend beyond a focus on income alone to examine the experience of deprivation across a range of dimensions. Recent literature on multidimensional poverty has taken a number of forms – it has included the delineation of conceptual frameworks to understand poverty multidimensionally, such as *Poverty as Capability Deprivation* (Hick, 2014), which is my articulation of a capability framework for poverty analysis, or UNICEF's Multiple Overlapping Deprivation Analysis (MODA) (Chzhen *et al.*, 2015). There have been a growing number of multidimensional poverty *applications* in both European and non-European contexts (e.g. Coromaldi and Zoli, 2012; Whelan et al., 2014; Wagle, 2008). And, there have been debates about the merits of, as well as innovations in, the *measurement* of multidimensional poverty itself (e.g. Alkire and Foster, 2011; Alkire and Santos, 2010; Ravallion, 2011; Ferreira and Lugo, 2013).

These debates touch on a variety of issues, two of which are pertinent for the present paper. The first relates to whether the extended focus on a range of dimensions is capturing *poverty* per se, or something else – such as well-being or multiple deprivation. For Alkire *et al.* (2015:1), 'poverty is a condition in which people are exposed to multiple disadvantages'. Their work draws on Amartya Sen's capability approach and, for Sen, poverty is equated with capability deprivation – limitations in what a person can do or be (e.g. Sen, 1999: 92). By definition, what a person can (or cannot) do or be is not restricted to 'material' deprivations. However, other authors, and especially those who do not draw on the capability approach, often conceive of multidimensional assessment as capturing something broader than poverty. To provide just one example, Bradshaw *et al.* (2007) understand their multidimensional assessment as capturing child well-being rather than just poverty.

A second key issue is whether information from different dimensions should be collapsed into a composite multidimensional measure (Saunders, 2015), or what Hick and Burchardt (forthcoming) have called 'the question of aggregation'. Ravallion (2011: 2) argues that accepting the multidimensionality of poverty 'does not imply that one needs a MIP' (multidimensional index of poverty). Ravallion's claim is that a composite, multidimensional index may not be

useful for policy purposes, since information is typically drawn from qualitatively distinct dimensions and is subsequently collapsed into an aggregate figure.

An alternative to employing a multidimensional index of poverty is to adopt a 'dashboard' approach, examining performance on a range of dimensions of deprivation individually. This is, for example, the approach of Burchardt and Vizard's (2011) Equality Measurement Framework, a capability-inspired framework for monitoring equality and human rights across ten domains in England, Scotland and Wales.

One advantage of the dashboard approach is that it allows data to be taken from multiple sources. This is significant because it means that analysts are not dependent on data collected in a single survey. However, one limitation of the dashboard approach is that it prevents us from examining the joint distribution of deprivations (Atkinson, 2003) – the extent to which some people simultaneously experience multiple forms of poverty and deprivation, and, more generally, the ways in which dimensions of poverty and deprivation relate to one another. Moreover, as Jenkins (2011) argues, there is a high demand, especially from policy-makers, for summary statistics, which also militates against adopting a dashboard approach.

Each of these arguments has some merit – a purely disaggregated approach, exploring change on multiple indicators, but offering no indication of the overall direction of travel, may be limited in terms of its impact and policy relevance. On the other hand, excessive focus on a multidimensional aggregate, combining dimensions of very different kinds, risks providing definitive but largely meaningless results. One of the virtues of the Alkire-Foster measure, which we apply in this paper, is that it allows multidimensional poverty to be decomposed by sub-group and – crucially - by dimension. This is significant as it allows researchers to move between aggregate to disaggregated analysis, as desired.

3. Poverty as Capability Deprivation

The analysis in this paper draws on *Poverty as Capability Deprivation* (Hick, 2014), which is one specification of Amartya Sen's capability approach (e.g. Sen, 1992; 1999; 2009). The central concepts of the capability approach are functionings and capabilities. A person's "functionings" refer to the various things a person succeeds in "doing or being", such as participating in the life of society, being healthy and so forth, whereas "capabilities" refer to a person's real or substantive freedom to achieve such functionings – for example, the ability to take part in the life of society (Sen 1999, 75). Of crucial importance is the emphasis on real or substantive – as opposed to formal – freedom, as capabilities are opportunities that one could exercise if so desired.

Poverty as Capability Deprivation emphasises the necessity of adopting a multidimensional assessment, focussing on both monetary and non-monetary dimensions and constraints. Three departures from the capability approach as Sen articulates it are significant. First, *Poverty as Capability Deprivation* is built around the two concepts of material poverty and multiple deprivation, where material poverty is defined as 'inadequate material living standards arising because of a lack of resources' (Hick, 2014: 307) and multiple deprivation is defined as 'the enforced experience of low living standards' (Hick, 2014: 310).

The reason for employing two concepts is because arguments in favour of multidimensionality are typically *ethical* or *normative* – that going beyond income alone is essential because a wider range of dimensions *matter* in some fundamental way. In this view, multidimensional analysis may be necessary in order to understand, say, the impact of the Great Recession in human terms, but this does not necessarily mean that each of the dimensions itself represents poverty or, indeed,

that only dimensions which capture poverty should be included in the analysis. Poverty has a reasonably well-established meaning in terms of relating to 'material' deprivations and, on this view, while a wider focus is necessary, these additional dimensions are more appropriately thought of as representing (multiple) deprivation rather than poverty *per se* (Hick 2014). In practice, the division is not always straight-forward to maintain, and in this paper we use it loosely since analysis focuses on entirely disaggregated and aggregated analysis, and not on material poverty and multiple deprivation, respectively (on the latter, see Hick, 2015).

A second distinction is that while the focus of *Poverty as Capability Deprivation* is on what people can do and be (namely, people's capabilities), resource-centric measures may still play some role in our analyses, which is at variance with most capability-inspired analyses. This is because while our theoretical interest is in people's capabilities (what they can do and be), our measures typically capture either their resources, or people's functionings (what they actually achieve). In some cases, it may be that what a person is able to do and be is better captured by their resources than by functioning information, especially when preferences are likely to play a significant role in the translation of capabilities into functionings or when functioning information is otherwise problematic (see also Hick, forthcoming, for a more detailed discussion). Thus, we include the relative income poverty measure partly because it features in the official poverty target of the European Union, but also because it serves as a proxy of the Townsendian concept of poverty (see below).

A third feature of *Poverty as Capability Deprivation* concerns the selection of dimensions. While Sen has emphasised the importance of democratic deliberation in the selection of relevant dimensions, I have argued that the analysis of poverty and deprivation should focus on what I have labelled 'primary goals' – the goals, or ends, which each person values, whatever their conception of the good and whatever else they value. I have argued that, at least at a certain level of generality, it is possible to identify such primary goals, and that it is these which should form the basis of assessment of poverty and deprivation (Hick, 2014).

4. The Alkire-Foster method

Moving to the question of measurement, the paper employs the Alkire Foster measure in order to measure change in material poverty and multiple deprivation in Europe. The Alkire-Foster measure is a member of the 'counting' family of multidimensional approaches, which count the number of dimensions on which people experience deprivation (Atkinson, 2003). Atkinson (2003) distinguishes between 'union' and 'intersection' approaches within this counting tradition –the former identifying those poor on *any* dimension and the latter focused on those poor on *all* dimensions included in multidimensional analysis. Both of these positions have limitations: as the number of dimensions included in any analysis increases, the union approach can identify extremely large proportions, and the intersection approach extremely small proportions, of the population as being poor.

The Alkire Foster measure overcomes these limitations by imposing a 'dual cut-off' – the first cut-off being the thresholds on each dimension; the second being the number of dimensions required to be classified as multidimensional poor. In this formulation, k represents the number, or percentage, of deprivations from d dimensions in order for a person to be classified as multidimensionally poor, and k can take different values, reflecting either the union or intersection approaches, *or any point in between*.

A novel feature of the AF measure is the calculation of 'censored headcounts' – or 'the percentage of people who are identified as poor [on the multidimensional measure] *and* are

deprived in each particular indicator' (Alkire *et al.*, 2014: 2, emphasis added). This definition has two implications: first, that people deprived on any given dimension (i.e. below the first cut-off) but *not* on the given multidimensional threshold (i.e. the second), will not be included in the censored headcount measure and will be classified as non-deprived; and second, this dual condition means that, by definition, the censored headcounts will classify fewer people than simple (or what they call 'raw') headcounts as being deprived.

The M_α class of Alkire Foster measures is derived from the methodology of Foster *et al.* (1984), which focuses on both incidence and intensity of poverty. In precise terms, the adjusted headcount measure, M_0, is the product of the multidimensional headcount ratio (H_k), or the proportion of the population classified as poor on k dimensions, and the average deprivation share amongst the poor (A) (Alkire *et al.*, 2014: 5), and thus that it is sensitive both to changes in the proportion of the population who experience multidimensional poverty and to the severity of their poverty. The resulting measure, M_0, is shown to satisfy a range of desirable properties, or axioms (see Alkire *et al.*, 2014; 2015 for a discussion).

Importantly, the inclusion of intensity (A) into measure M_0 enables it to be decomposed in a way that 'is not possible with counting-based headcount ratios' (Alkire *et al.*, 2014). Specifically, M_0 can be disaggregated both by population sub-group (which is possible using any counting approach) and, importantly, by dimension (which is not possible using simple counting approaches). The ability to disaggregate by dimension gives additional meaning to the aggregate multidimensional poverty measure, since it enables an analysis not only of *who* is poor but also of *how* people are poor (Alkire and Sumner, 2013). Significantly, it is the 'censored' headcount measure which enables such disaggregation by dimension to occur: the weighted sum of censored headcounts is equal to the adjusted headcount measure, M_0.

Exploring the multidimensionality of poverty and deprivation in this way allows us to analyse the extent to which there is a *coupling of disadvantages* – not just an increase in any one or more of the various dimensions of poverty and deprivation individually, but an increase in the experience of multiple forms of poverty and deprivation simultaneously.

5. Data

The analysis presented in this paper draws on data from the EU Survey on Income and Living Conditions (EU-SILC, version 31.3.15) at four time points. We take 2005 as the first observation as many nations did not participate in the first, 2004 wave of SILC. The year 2008 is taken as being the final pre-crisis year. While the collapse of Lehman Bros., a significant moment in the crisis, occurred in September of that year, for 17 Member States considered here, fieldwork for the 2008 wave had completed prior to September (Eurostat, 2010: 23). We divide the crisis into two periods – a first phase from 2008 to 2011, and a second phase from 2011 to 2013, which is the most recent year for which we have data.

Analysis is restricted to EU Member States who have complete records for the four years in question. Data are not available in the early, pre-crisis period for Bulgaria, Romania and Malta, or in the first two periods for Croatia; the analysis is therefore based on the remaining 24 Member States. The analysis is limited to adults over the age of 18 and the individual is taken as being the unit of analysis. This latter decision is made because we have a theoretical preference to focus on individuals and not just households. In practice, five of our seven dimensions are collected at the household level (relative income poverty, material deprivation, living in a workless household, economic stress, neighbourhood deprivation). We therefore make the ubiquitous, though problematic, assumption of equal sharing within households. However, focusing on the

individual as the unit of analysis allows us to make full use of the individual-level data for the health deprivation and unmet needs variables. The analysis is based on a completed case analysis in each year, and the data are weighted throughout to account for selection and non-response bias.

5.1 Dimensionality

The selection of dimensions is based on both conceptual and empirical considerations. In terms of conceptual considerations, the focus is on items or dimensions which conform to *Poverty as Capability Deprivation* (Hick, 2014). In this capability-inspired framework, the analytic focus is on 'ends which each person shares, whatever their conception of the good and whatever else they value' (2014: 311, emphasis supressed). The framework requires that the dimensions selected reflect (i) capabilities or, alternatively, functionings where (ii) we can assume each person prefers above a minimal threshold of achievement (see Hick, 2014, for a detailed discussion). There is one exception in the analysis – we include living in a workless household as one of the dimensions because it is one of the official poverty measures of the European Union under the EU 2020 strategy. It is far from clear that this would meet the definition for inclusion identified above, since one can question whether *living* in a workless household is really a deprivation which affects all members (i.e. that it is indicative of a deprivation in terms of their functionings), and whether worklessness is necessarily involuntary (i.e. adult household members may be performing other valuable activities, such as caring for other family members).

Inevitably, reliance on EU-SILC, or indeed any secondary dataset, means that while our analysis of the impact of the Great Recession extends beyond a focus on material poverty alone, it still falls some distance short of the ideal to which we might aspire. Thus, we have 'exclusion errors' (Hick, 2012) – namely, the exclusion of dimensions, such as housing deprivation or mental health, which we would want to include in an ideal analysis, but which are not available in the dataset.

After imposing this conceptual decision rule, the remaining items contained in EU-SILC were analysed empirically, using factor analysis, in order to explore their dimensionality. Again, there is one important departure from this reliance on factor analysis – the material deprivation measure is constructed using the official EU2020 methodology, despite the fact that the material deprivation index would not comprise the items contained in the 'official' measure if based on empirical considerations alone. Moreover, our indicator of subjective economic stress *does* load onto this material deprivation dimension, based on our empirical analysis, but we do not include this item in the measurement of material deprivation because of (i) our desire to rely on the same items used in the official EU 2020 measure and because (ii) in conceptual terms, we believe a subjective evaluation of economic stress is a measure distinct from material deprivation, which is, in theory at least, a more objective measure.

These considerations result in an analysis of seven dimensions:

- Relative income poverty (*natpov*)
- Material deprivation (*matd3*)
- Living in a workless household (*workless_hwi*)
- Economic stress (*d_endsmeetx*)
- Health deprivation (*d_health*)
- Neighbourhood deprivation (*d_neighbour*)
- Unmet medical or dental need (*d_unmet*)

The relative income measure is set at 60% of national median income. As the indicator is based on national median income, it is a purely relative measure, with poverty thresholds set at very different levels depending on the Member State in question. This measure is included a proxy of the Townsendian concept of poverty, defined as a circumstance where people's 'resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary living patterns, customs and activities' (Townsend, 1979: 31). While this measure has often be criticised for its arbitrary threshold, I have argued elsewhere that it represents a rough proxy of the Townsendian concept of poverty (Hick, 2014).

The material deprivation measure relies on an index comprised of the sum-score of nine deprivation items. These are: (i) whether respondents have fallen into arrears on mortgage or rent payments, utility bills or other loans; (ii) the ability to afford a week's annual holiday away from home; (iii) the ability to afford a meal with meat, chicken, fish or a vegetarian equivalent every second day; (iv) capacity to face unexpected financial expenses; (v) whether respondents have a telephone (or mobile phone); (vi) a colour TV; (vii) a washing machine; (viii) a car, and (ix) whether respondents can afford to keep their home adequately warm. We impose a threshold at three or more deprivation items – an easier threshold than that used in the official poverty target of the European Union. This ensures that income poverty and material deprivation are experienced by roughly similar proportions of the population of Europe. This threshold is set at the same value for the each of the twenty-four Member States consider here, in contrast to the relative income measure.

The third dimension is living in a workless household. Serious questions have been raised about the desirability of including this indicator in Europe's poverty target (e.g. Nolan and Whelan, 2011b; see also above). Nonetheless, it is included here given the prominence afforded to a low work intensity indicator in the EU2020 strategy. The indicator analysed here focuses on respondents living in workless households as it provides a more intuitive measure of the same idea of low work intensity. The empirical similarity between these indicators is also very high – the overwhelming majority of households with low work intensity are workless households. We follow the exclusion criteria of the official low work intensity measure, meaning that people aged 60 or over are excluded from the measure, as are household comprised entirely of students. Our measure thus captures living in a workless household, but following the exclusion criteria which are imposed on the official low work intensity indicator.

Our measure of economic stress is based on a self-report of the difficulty that households experience in making ends meet. This question asks respondents whether they are able to make ends meet: (i) with great difficulty, (ii) with difficulty, (iii) with some difficulty, (iv) fairly easily, (v) easily, (vi) very easily. Only those respondents who report that they can only make ends meet with great difficulty are classified as deprived on this dimension – quite a severe threshold.

Health deprivation is based on a single question about a person's overall health. Respondents are asked to rate their health on a five-point likert scale from very good to very bad. Those who report that their health is either very bad or bad are classified as experiencing health deprivation.

Neighbourhood deprivation captures deprivation in terms of one's neighbourhood or living environment. The measure is based on three indicators – whether a person experiences (i) noise coming from neighbours or outside, (ii) pollution, grime or other environmental problems in the local area; (iii) crime, violence or vandalism in the local area. A person is classified as deprived in terms of neighbourhood deprivation if they are deprived on two of these three items.

The survey question used to measure unmet needs asks respondents whether there was an occasion in the last twelve months where 'there was at least one occasion when the person really needed dental [or medical] examination or treatment but did not'. Where respondents report not receiving medical [dental] treatment when they needed it, they are asked about the reason for this occurring. The response categories are: 1) Could not afford to (too expensive), 2) Waiting list, 3) Could not take time because of work, care for children or for others, 4) Too far to travel/no means of transportation, 5) Fear of doctor/hospitals/examination/ treatment, 6) Wanted to wait and see if problem got better on its own, 7) Didn't know any good doctor or specialist, 8) Other reasons. Though distinguishing between choice and constraint is a difficult business (Hick, 2012; 2013), we classify responses 1-4 as indicative of a lack of ability to access medical or dental care, when this was needed, and 5-8 as indicating non-deprivation on this dimension because these reasons do not appear to indicate a lack of ability access to medical or dental treatment.

In the main analysis which follows, these dimensions are equally weighted when aggregate multidimensional measures are presented. Alternative sets of weights are considered in the sensitivity analysis in the penultimate section. Following Suppa (2015), we multiply the aggregate multidimensional poverty measure, M_0, by 100 in order to ensure better readability of the figures which we present.

While the multidimensional measure M_0 is sensitive to both the incidence and intensity of poverty, one limitation of the Alkire Foster measure is that values of M_0 have no intuitive interpretation in the way that the traditional headcount measure does. A multidimensional value of 5 could represent 5% of the population experiencing deprivation on 100% of dimensions, or 10% of the population experiencing deprivation on 50% of dimensions, or 20% of the population experiencing deprivation on 25% of dimensions. Moreover, the consequence of multiplying incidence and intensity means that values are typically lower than headcount rates and thus that changes in M_0 values are (often considerably) more significant than equivalent changes in headcount rates.

6. Analysis

We start by examining trends in each of the indicators over the period 2005 to 2013. This serves to highlight the overall pattern of raw headcounts as well as enabling to reader to understand the four time-points analysed later in the paper in their wider context. In Figure 1, one can observe that the different dimensions display distinct trends over the period. Some - such as material deprivation, economic stress, unmet needs and living in a workless household, fall in the pre-crisis period, only to rise thereafter. Others – such as neighbourhood deprivation and, to a lesser extent, health deprivation, fall reasonably consistently throughout the period. Relative income has two data points which deviate sharply from the broader trend, which is one of consistency over time. This is significant because the trend in relative income poverty, the most widely employed measure of poverty, is distinct from that of the other dimensions considered here.

A second important point to note is that while efforts have been made to equalise the proportion of the population affected by each indicator, there remain important differences. In particular, between 7 and 11 per cent experience health deprivation, economic stress, living in a workless household, and unmet needs over the period. In contrast, relative income poverty, material deprivation and neighbourhood deprivation are more prevalent, experienced by 13-17 per cent of the population for most of the period in question. This greater prevalence gives these indicators an implicit higher weight in the aggregate measurement of multiple deprivation which follows.

Figure 1. Percentage experiencing deprivation on each dimension over time

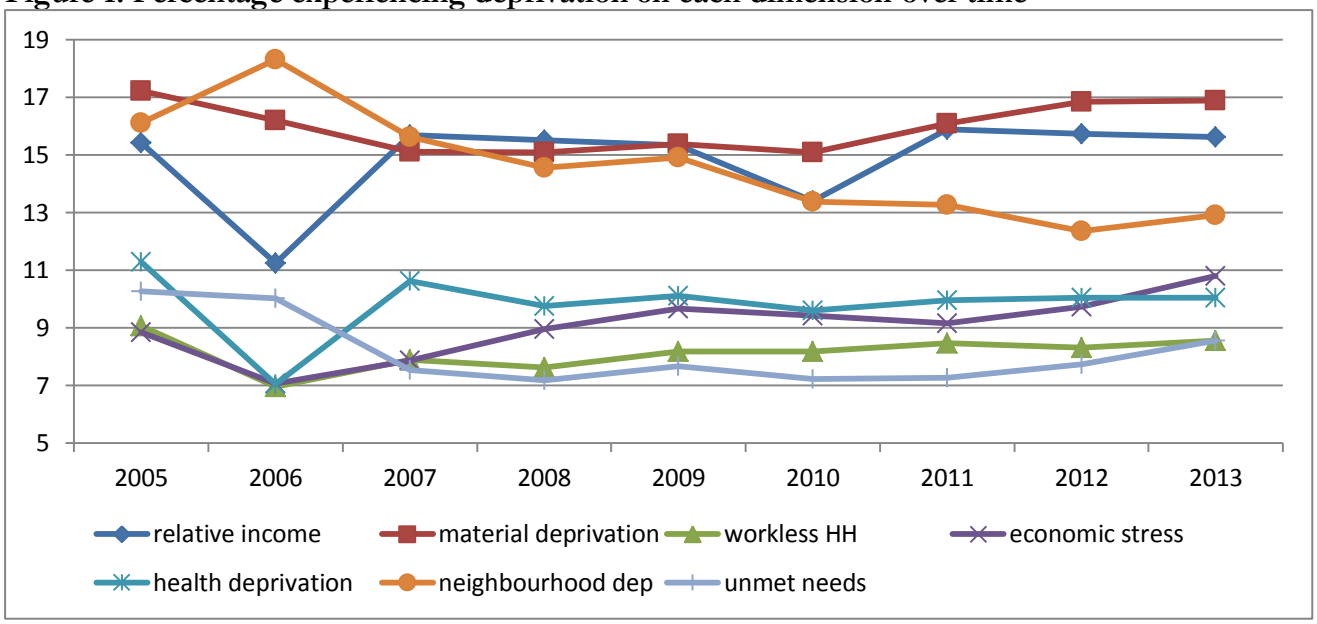
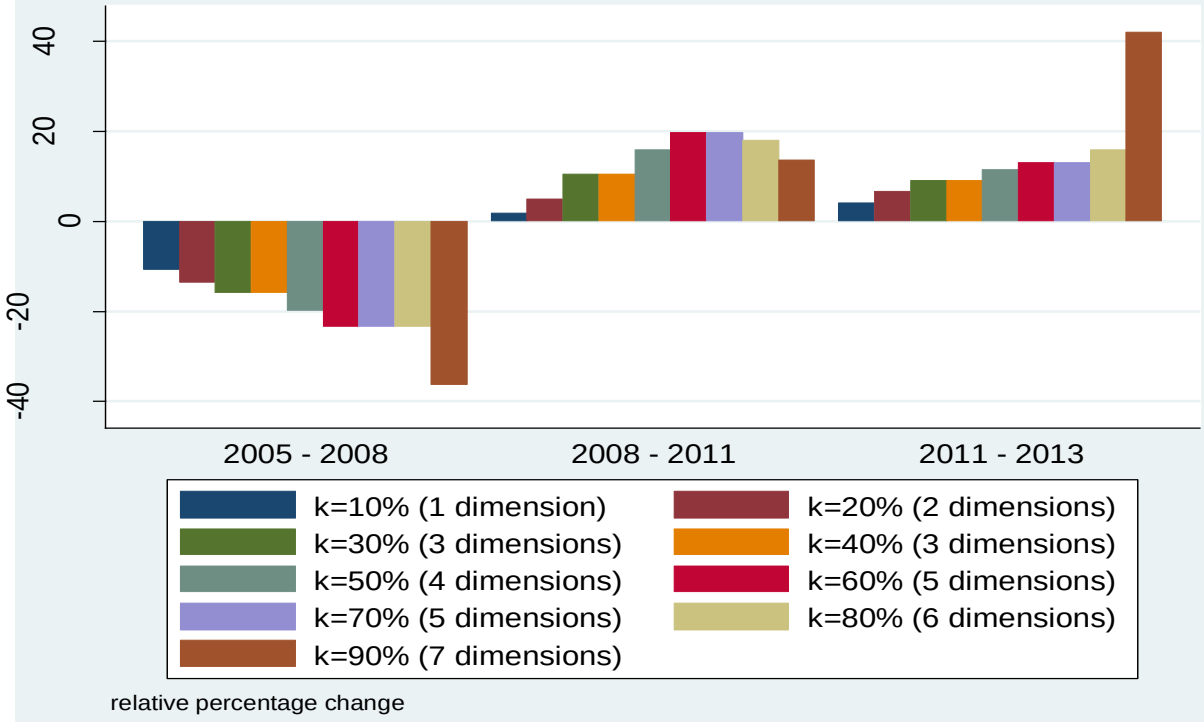


Table 1. Exploring the relationship between the dimensions, 2013

	income poverty	material dep	workless HH	economic stress	neighbourhood dep	health dep	unmet needs
income poverty	1						
material dep	0.3014	1					
workless HH	0.2981	0.2375	1				
economic stress	0.2362	0.4541	0.1926	1			
neighbourhood dep	0.03	0.0825	0.0511	0.0649	1		
health deprivation	0.0614	0.138	0.0652	0.119	0.0388	1	
unmet needs	0.1019	0.2307	0.0726	0.2049	0.0644	0.1108	1

In Table 1, we present a correlation of the different dimensions of poverty and deprivation using data from the most recent, 2013 wave. In general, the correlation between the different dimensions is relatively low, with the exception of the correlation between material deprivation and self-reported economic stress, which is .45. Aside from this, the correlations between the EU2020 measures of poverty are all above 0.2 - most other correlations are below this value (the exceptions are the correlation between economic stress and both relative income poverty and unmet needs, and between unmet needs and material deprivation).

Figure 2. Change in M_0 over in three periods, by values of dimensional cut-off k



In Figure 2, we present the percentage change in the adjusted headcount, *Mo*, across a range of multidimensional thresholds, *k*. We can observe that multidimensional poverty falls sharply in the pre-crisis period, with the greatest reductions in *Mo* observed at higher thresholds. For example, at a threshold of 3+ dimensions (affecting about 10% of the population), *Mo* falls by 15%. At a threshold of 5+ dimensions (affecting about 4% of the population), the reduction is by about 20% in this pre-crisis period.

In the first phase of the crisis (2008 – 2011), multidimensional poverty at a level of 1 dimension (that is, experiencing *any* of the deprivations) increases only very marginally (<2%). Indeed, the multidimensional headcount *H* – that is, the proportion of the population deprived on any dimension actually *falls*, and the slight increase in *Mo* observed here is due to an increased poverty gap, *A* (disaggregation not shown). *Mo* increases at higher dimensional thresholds, with a rise of 10% at 3+ dimensions and peaking at a 20% rise at 5 of more deprivations.

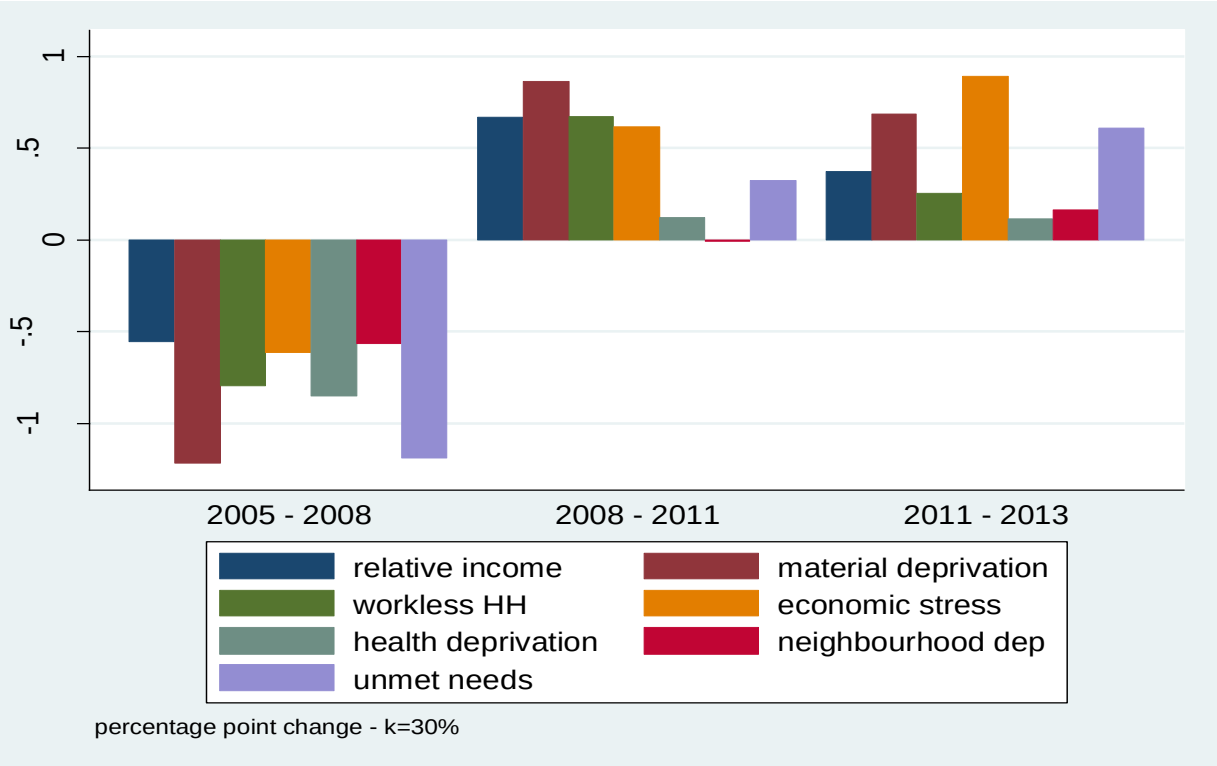
In the second phase of the crisis, increases in multidimensional poverty are more consistent across dimensional thresholds, though are not as sharp as in the preceding period, with the exception of a measuring employing a threshold at 7 dimensions. At a threshold of 3+ dimensions, *Mo* increases by a further 10% in this second phase of the crisis.

In order to disaggregate *Mo*, one dimensional threshold *k* needs to be set for the main analysis. For the purposes of this paper, a threshold at 3 or more dimensions (k=30%) is selected as the relevant multidimensional threshold – others are considered in the sensitivity analysis in the penultimate section.

6.1 Changes in censored headcounts by dimension and disaggregation of *Mo* by dimension

As noted above, in addition to the typical headcount measures which capture the proportion of the population who experiencing deprivation on a particular dimension ("raw" headcounts), the Alkire Foster measure introduces a new measure – the "censored" headcount. This censored headcount captures the proportion of the population who experience deprivation on a particular dimension *and* who are above the multidimensional poverty threshold, *H*, which, for the purposes of this analysis is set at k=30% (i.e. 3 dimensions).

Figure 3. Change in censored headcounts for each dimension over three periods



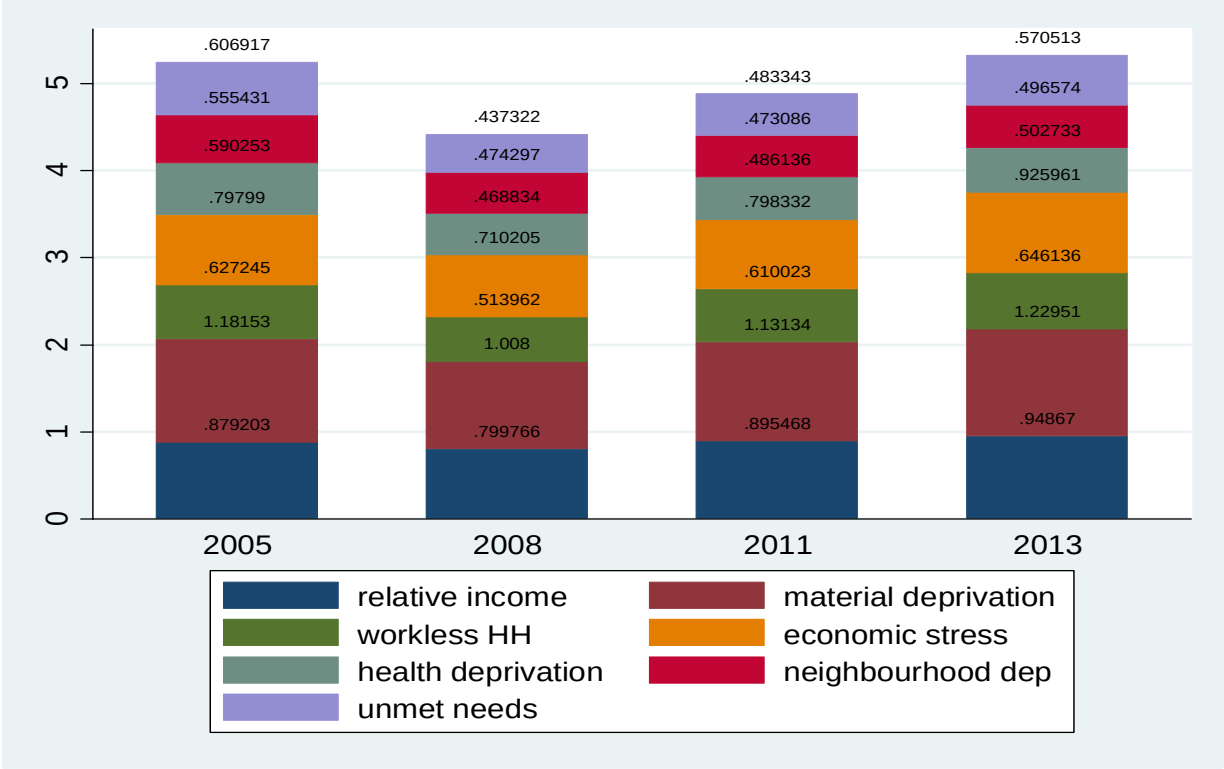
In Figure 3, we can see that there between 2005 and 2008, the censored headcounts for each dimension fall by about 0.5 to 1 percentage point, with the largest reductions for material deprivation and unmet medical or dental needs. The two crisis periods are associated with increases in censored headcounts on most dimensions. Taking these two periods together, the increases in relative income poverty, material deprivation, living in a workless household and economic stress are greater than the reductions in the pre-crisis period. For the other three dimensions, the increases are not so great as to offset the previous reductions, and increases in the censored headcount rates for neighbourhood deprivation and health deprivation are very modest indeed.

In Figure 4, we take advantage of the ability to disaggregate *Mo* by dimension for the four time periods considered in this paper. The total height of the stacked bars represents the values of *Mo* at each time period. As we can see, there is a sharp fall in multidimensional poverty in the pre-crisis period, which is only just made up by 2013. However, while the total values of *Mo* are almost equal in 2005 and 2013, the contribution made by each dimension to the experience of multidimensional poverty changes over this period. Specifically, the contribution made by health and neighbourhood deprivation and unmet needs is less in 2013 when compared with 2005

values, while a greater contribution is made by the three official EU poverty measure and by economic stress.

It is, perhaps, surprising that the Great Recession does not result in the adjusted headcount measure, *Mo*, substantially exceeding its pre-crisis value by 2013. The reason for this, as we can see, are that (i) the pre-crisis reductions in multidimensional poverty in Europe were non-trivial and (ii) censored headcounts for health and neighbourhood deprivation and unmet needs have not returned to their pre-crisis levels, which offsets increases in the official EU poverty measures and in economic stress.

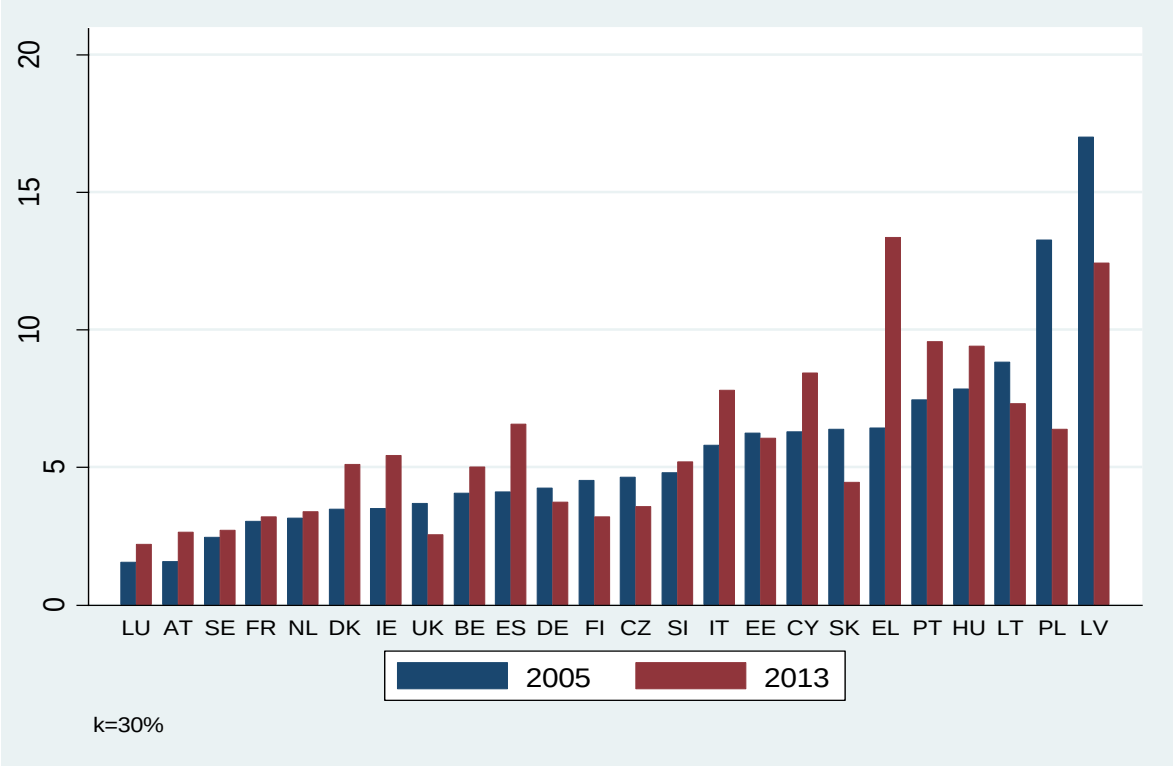
Figure 4. Disaggregation of M_0 by dimension at four time points



6.2 Analysis of M_0 by Member State

However, we may also be interested not just how change in multidimensional poverty breaks down by dimension, but how it has been experienced in different countries. In Figure 5 below, we compare rates of *Mo* in two time periods, 2005 and 2013, for each nation, with the bars ordered by nations' 2005 multidimensional poverty values. A number of patterns are evident. First, there are sizable reductions in multidimensional poverty in nations with the greatest levels of multidimensional poverty in 2005 – Poland and Latvia (reductions of 7 and 4.5 respectively). At the same time there are increases – typically modest – for most nations, and this includes nations with the lowest rates of multidimensional poverty. This explains why there has been a reduction in the variation in multidimensional poverty levels by Member State over the period, as we discuss below.

Figure 5. *Mo* by Member State - 2005 & 2013 compared



A second key finding from Figure 5 is that many of the nations with sharp rises in multidimensional poverty over the period – e.g., Greece, Cyprus, Spain, Portugal and Ireland, are nations which have required bailouts from the EU-IMF or, in the case of Spain, support for bank recapitalisation which also entailed policy conditionality. Italy has also experienced a substantial rise in its multidimensional poverty. Indeed, the increase in multidimensional poverty in Greece has been so significant that by 2013 it was the Member State with the highest rate of multidimensional poverty in Europe.

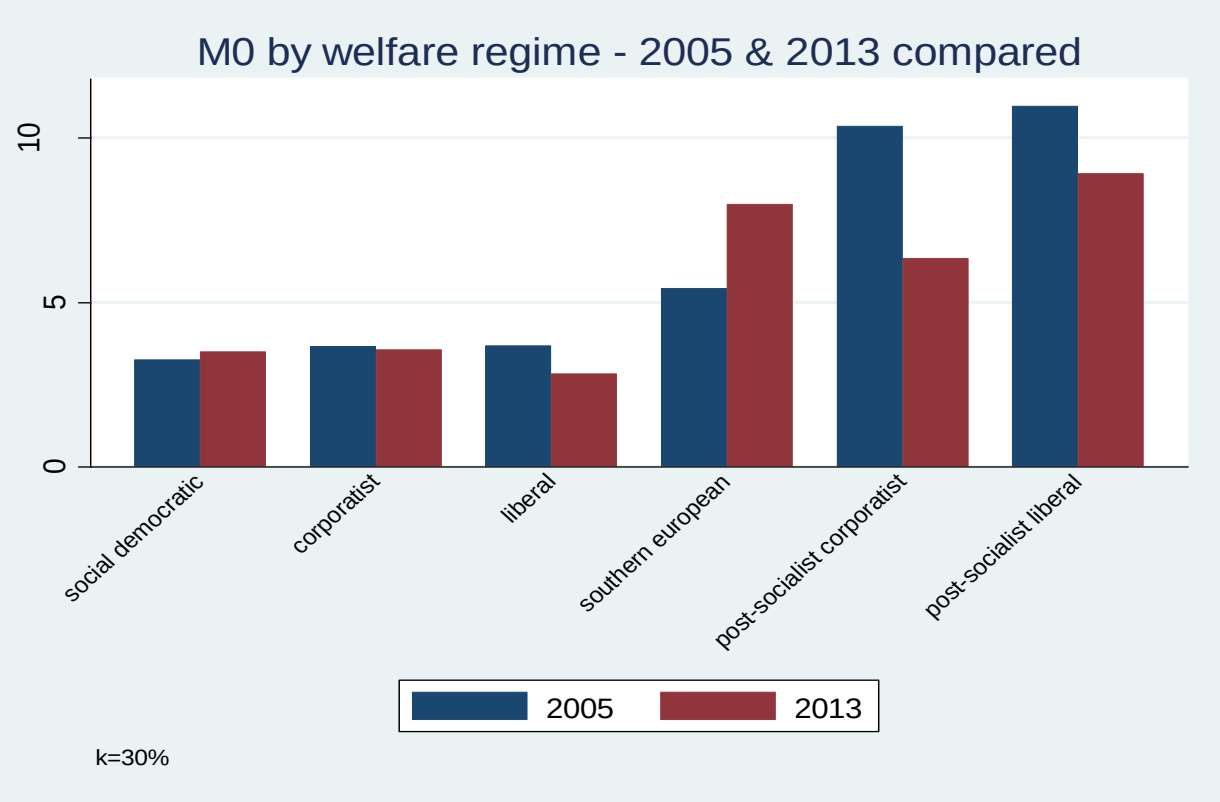
In Figure A1 in the Appendix, we present the coefficient of variation of Member States' values of *Mo* for each of the four time periods considered. This shows that at multidimensional thresholds between 1 and 4 dimensions (k=50%), variation between Member States' multidimensional poverty rates reduced between 2005 and 2008 and was then reasonably stable thereafter. The pre-crisis period was thus associated with some degree of convergence in the multidimensional poverty rates of Member States.

In Figure 6, we cluster Member States into welfare regimes,[1] and compare rates of *Mo* in 2005 and 2013. One can observe, as expected, the patterns discussed above – namely, a sharp reduction in the Post-Socialist Corporatist countries (*Mo* falls by 4) and a smaller, though nonetheless substantial, reduction in the Post-Socialist Liberal nations (a fall of 2), accompanied by a substantial *increase* in multidimensional poverty in Southern Europe (of 2.5). There is also a reduction in multidimensional poverty in the Liberal regime, which is driven by the performance of the UK, where multidimensional poverty falls between 2011 and 2013. In Figure A2 in the Appendix we show that the ordering of 2013 values of *Mo* between Southern European and

[1] Definition of regimes, following Nolan and Whelan (2011a): Social Democratic (SE, DK, FI, NL), Corporatist (LU, AT, BE, DE, FR), Liberal (UK, IE), Southern Europe (IT, ES, CY, EL, PT), Post-Socialist Corporatist (SI, CZ, SK, PL, HU), Post-Socialist Liberal (EE, LV, LT).

Post-Socialist Welfare regimes is robust to the selection of a threshold at *any* number of dimensions, *k*.

Figure 6. Multidimensional poverty by welfare regime



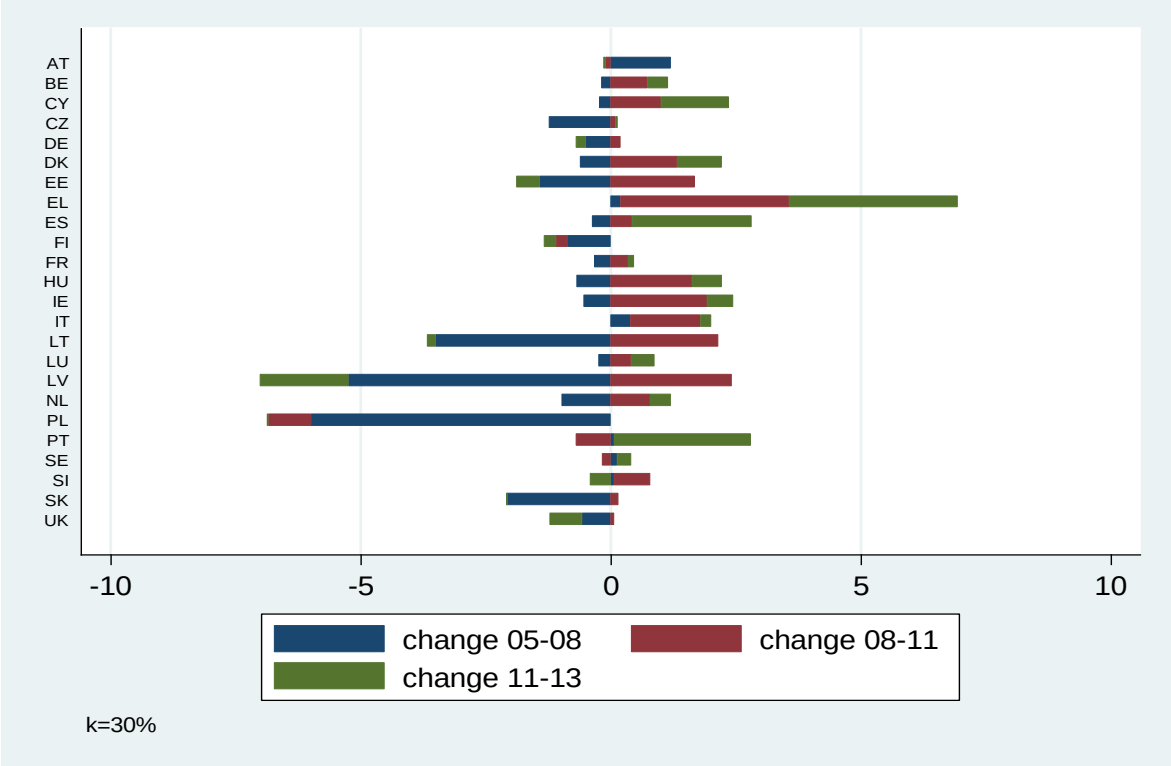
In Figure 7, we present change in *Mo* over the three periods in each of the Member States considered here. Figure A3 in the Appendix provides the equivalent figure by welfare regime. There are reductions in *Mo* in most countries between 2005 and 2008. Reductions are particularly sharp in some of the poorest nations – Poland, Latvia, Lithuania and, to a lesser extent, Slovakia. What is also striking is that the Southern European nations largely fail to benefit from falling multidimensional poverty rates during this period: *Mo* rises in Italy, Greece and Portugal and only falls slightly in Spain and Cyprus.

During the first phase of the crisis, *Mo* rises reasonably quite consistently. Greece experiences the largest rise in *Mo* (a rise of 3.4), with other Southern European nations, Ireland and Post-Socialist Liberal nations (i.e. Latvia, Lithuania and Estonia) also experiencing increases in multidimensional poverty. In one-third of nations, *Mo* values increase by 1 or more (which implies a relative increase over the period of between 15% (Cyprus) and 65% (Ireland) over 2005 values depending on Member State).

In the second phase of the crisis, between 2011 and 2013, the change in multidimensional poverty is no longer as consistent. Ten nations experience a modest reduction in *Mo*, and the nations with the greatest increases are those nations who required a bailout (e.g. Greece, Portugal, Cyprus and to a lesser extent Ireland), and Spain. Greece experiences the largest increase in both crisis periods. The performance of these "bailout" nations is, perhaps, not surprising given the austerity that was demanded of them as a condition of accessing loans from the EU-IMF. What is perhaps less expected is that the disappointing performance of the

Southern European nations pre-dates the crisis itself, with these nations having failed to benefit from multidimensional poverty reductions in the pre-crisis years (see also Figure A3).

Figure 7. Change in *Mo* over three periods by Member State

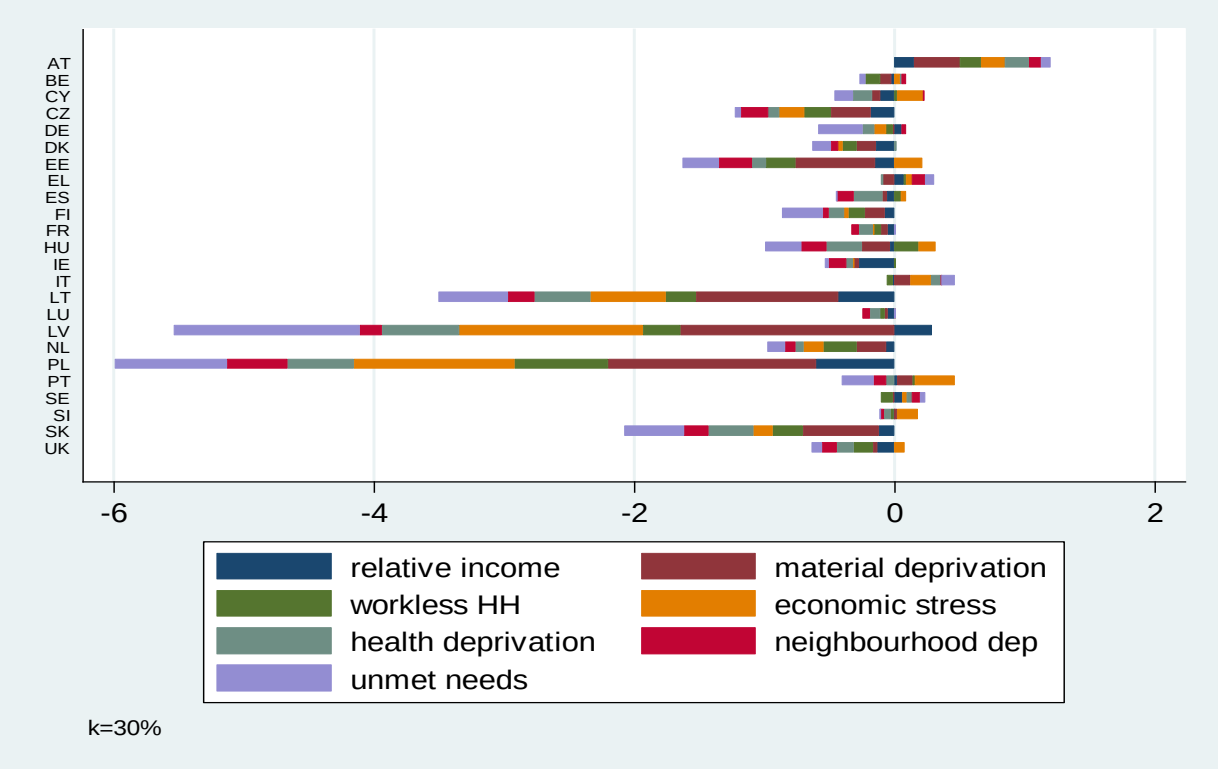


6.3 Disaggregation of change in M_0 by dimension and by country

In the following two figures, we disaggregate change in M_0 by dimension for each of the Member States. To do this, we rely on censored headcounts. We have noted that M_0 is equal to the sum of weighted censored headcounts. However, while censored headcounts are used in order to disaggregate the data in this way, Figures 8 & 9 are presented in terms of units of M_0, and thus the values do not bear the same interpretation as censored headcounts (though the direction of change and relative balance between dimensions will be the same).

We have previously noted that substantial reductions in M_0 were observed in Poland, Slovakia and the three Post-Socialist Liberal nations in the pre-crisis period. In Figure 8 we can observe that reductions in material deprivation, economic stress and unmet needs were substantial in contributing to this reduction in these nations. In many nations more modest contributions were made by reductions in unmet needs, neighbourhood deprivation and material deprivation. Three of the Southern European nations (Italy, Cyprus, Portugal) experience increases in economic stress in this pre-crisis period, which contributes to their disappointing multidimensional poverty performance.

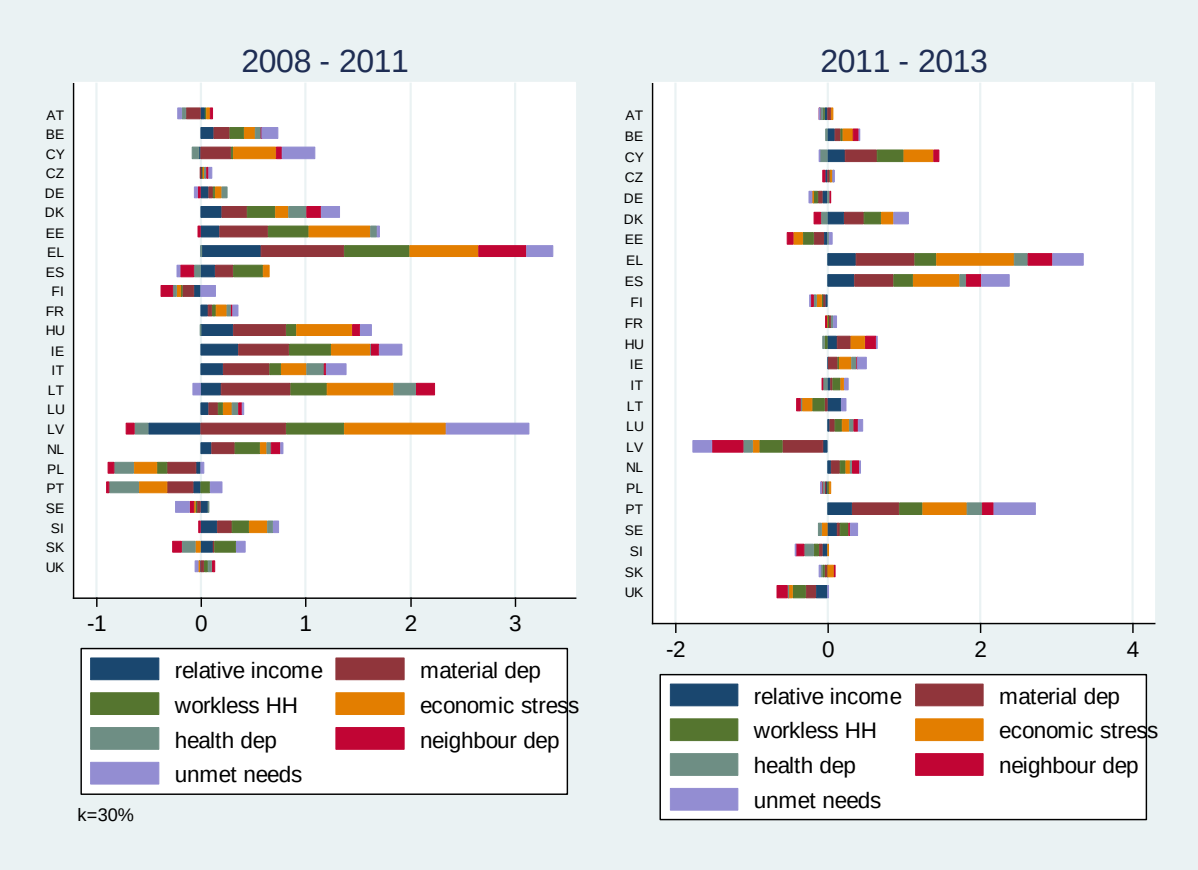
Figure 8. Disaggregation of change in M_0 between 2005 & 2008 by dimension for 24 Member States



In the first of the crisis periods (2008 to 2011), in many countries all dimensions contribute to a rise in M_0 (i.e. the censored headcounts increase on all dimensions), with substantial increases for economic stress and for the three official EU poverty indicators in many nations (Figure 9, left hand side). There are particularly sharp increases in M_0 in Greece and Latvia, though Latvia has some dimensions where censored headcounts fall (namely, relative income poverty, health deprivation and neighbourhood deprivation), thus offsetting increases elsewhere, while Greece experiences a rise in censored headcounts on all dimensions (bar health deprivation, where there is a negligible reduction).

This pattern continues in the 'second phase' of the crisis, where, as we have seen, some of the bailout nations (Greece, Portugal and Cyprus) and Spain experience the sharpest increases in M_0. In Figure 9 (right hand side) we can see that all of these nations (bar Cyprus) experience a rise in censored headcounts on every dimensions, with particularly large increases in terms of the three official poverty measures and economic stress, once again. Ireland experiences consistent increases in censored headcounts on all dimensions, though these are more modest than the other bailout nations in this second phase of the crisis.

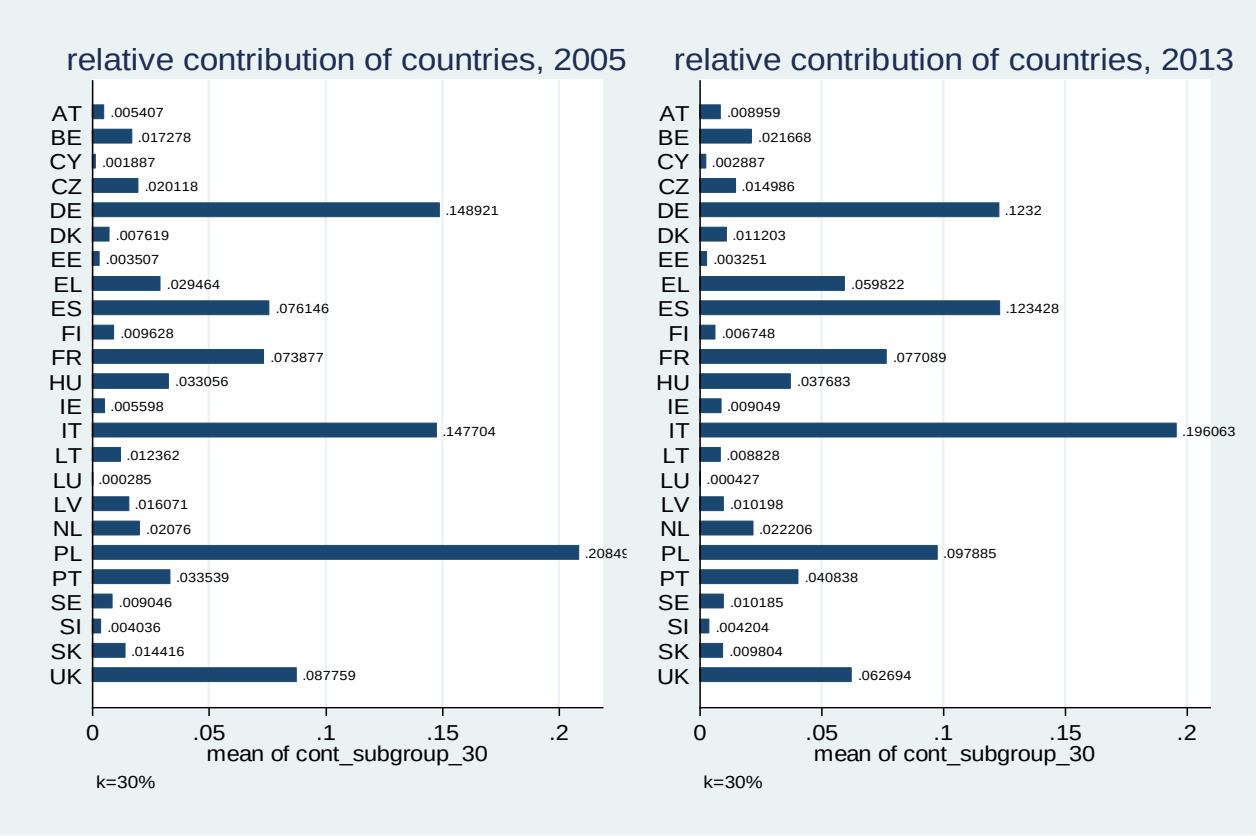
Figure 9. Disaggregation of M_0 by dimension during the two phases of the crisis



6.4. Composition of multidimensional poverty by country

In this final country-disaggregated analysis, we move beyond a focus the *risk* of multidimensional poverty by country to look at its *composition*. This is particularly important in the case of Europe given the very substantial variation in population size of the Member States. Figure 10 presents a comparison of the composition of multidimensional poverty, at k = 30% (i.e. three dimensions) in 2005 and 2013. The starkest finding is that the reduction in multidimensional poverty in the poorer Member States means that, by the end of the period, Poland is no longer the Member State which accounts for the largest share of multidimensionally poor Europeans – by 2013, it has been overtaken by Italy. This is because, as we have illustrated, Italy experiences a sizable increase in multidimensional poverty risk over the period of the Great Recession and also has a large population which ensures that this translates into a substantial multidimensional poverty share. Indeed, the proportion of people experiencing multidimensional poverty who live in Southern Europe increases from 28% to 43% over the period 2005 to 2013, while the proportion living in Post-Socialist Corporatist nations has reduced from 28% to 17% over the same period (see Appendix A4).

Figure 10. Comparison of share of multidimensional poverty by Member State, 2005 & 2013



7. Sensitivity analysis

A substantial battery of sensitivity analyses have been conducted to test the robustness of the findings presented above. Sensitivity analyses 1 – 4 all relate to the weighting of dimensions. First, in view of the relatively high correlation between material deprivation and economic stress (Table 1), we give each of these dimensions a 'half' weight, to reflect this. Thus, the remaining five dimensions are weighted $1/6^{th}$ each, with material deprivation and economic stress weighted $1/12^{th}$ each. Secondly, for similar reasons and because it is sometimes argued that economic stress is undesirable because it is a 'subjective' indicator, we drop this and analyse the remaining six dimensions, weighted equally. Third, we give the four non-official poverty measures (economic stress, health and neighbourhood deprivation and unmet needs) half of the weight of the official items (so, a $1/10^{th}$ weight for each of the non-official measures and 1/5 for each of the official poverty measures). Fourth, and in some senses the opposite of the previous weighting, we count the three official poverty measures as being one dimension (thus, giving weighting the three official measures $1/15^{th}$ each, and the remaining four dimensions $1/5^{th}$ each).

There are then two additional analyses based on other issues. In analysis 5 we examine country orderings for different dimensional thresholds, *k*. In analysis 6, we analyse 2013 data only, but for all 28 Member States (thus, including Bulgaria, Romania, Malta and Croatia).

The results of these six analyses are not presented here in detail for reasons of brevity, but the output files are available from the authors on request. Broadly speaking, the findings are robust to these amendments. Here, however, we focus on the two main areas where the findings diverge from those presented above.

First, Greece does not always display the highest multidimensional poverty rates in Europe in 2013. The finding *does* hold when material deprivation and economic stress are half-weighted (analysis 1), when the four additional Member States, including Romania and Bulgaria, are included in the 2013 analysis (analysis 6), for values of k<=40% (analysis 5), when we half weight the non-official measures (analysis 4) and then one-third weight the official measures (analysis 3). However, when economic stress is removed (analysis 2), or the multidimensional threshold k rises above k=40% (analysis 5), Latvia overtakes Greece as being the nation with the highest rate of multidimensional poverty in Europe. However, in those analyses where Greece is *not* the Member State with the highest rate of multidimensional poverty, it remains a close second, with its multidimensional poverty value increasing substantially between 2005 and 2013 (analyses #2; #5). The rise in multidimensional poverty in the bailout nations (observed in #1 - #4, and #5 at least up to k=50%) and change in the ordering of the composition of multidimensional poverty from Italy to Poland between 2005 & 2013 (analyses #1 - #5) are both found to be robust across the analyses undertaken here. Similarly, the change in the ordering of Post-Socialist Corporatist and Southern European welfare regimes in terms of their multidimensional poverty values between 2005 and 2013 is also observed in analyses #1 - #5.

Second, the multidimensional poverty measure *Mo* does not always increase by 2013 to a value which exceeds that of 2005 (it does not do so at most values of k in analyses #1, #2, #4 and to a lesser extent #3). Indeed, it does not do so in the main analysis when the threshold k<30% (analysis #5). Nonetheless, in each analysis and at almost every threshold of k, the general pattern of a reduction in multidimensional poverty between 2005 and 2008, and subsequent rise in both phases of the crisis can be observed.

8. Reflections on the Alkire-Foster method

As we have noted, the Alkire-Foster method amounts to a step forward in terms of the measurement of multidimensional poverty by enabling decomposition of the multidimensional poverty measure *Mo* not only by population subgroup (which all counting measures can achieve), but also by dimension (which other measures cannot). This is facilitated by the use of the 'censored' headcount measure – the proportion of the population who experience deprivation on a particular dimension *and* are experience deprivation across a set number of dimensions (the dimensional threshold k).

The argument in favour of censored, as opposed to raw, headcounts is that poverty is, according to Alkire *et al.* (2015: 1), is 'a condition in which people are exposed to multiple disadvantages'. It is suggested that focusing on censored headcounts is justified for reasons of *priority* and *validity*. The claim of *priority* is that 'we want to focus on the acutely poor' and that deprivation on one dimension may be considered more severe when it is associated with poverty [i.e. the experience of deprivation across multiple dimensions]. The claim of *validity* is that 'raw headcount ratios may not indicate deprivation accurately due to poor data quality or incomplete indicators' or that 'raw headcount indicators may include people that "choose" to be deprived in that indicator' (Santos and Alkire, 2011: 16).This suggests that censored headcounts are less likely to be prone to measurement error than their raw equivalents.

However, there are two arguments which might be made against this position – one theoretical, the other empirical. The theoretical argument is that if we include a particular dimension (say, health deprivation) because we believe this is in some sense fundamental to human well-being or constitutive of human need, then it seems odd to subsequently give deprivation on this dimension zero weight because a person does not also experience, say, living in a workless

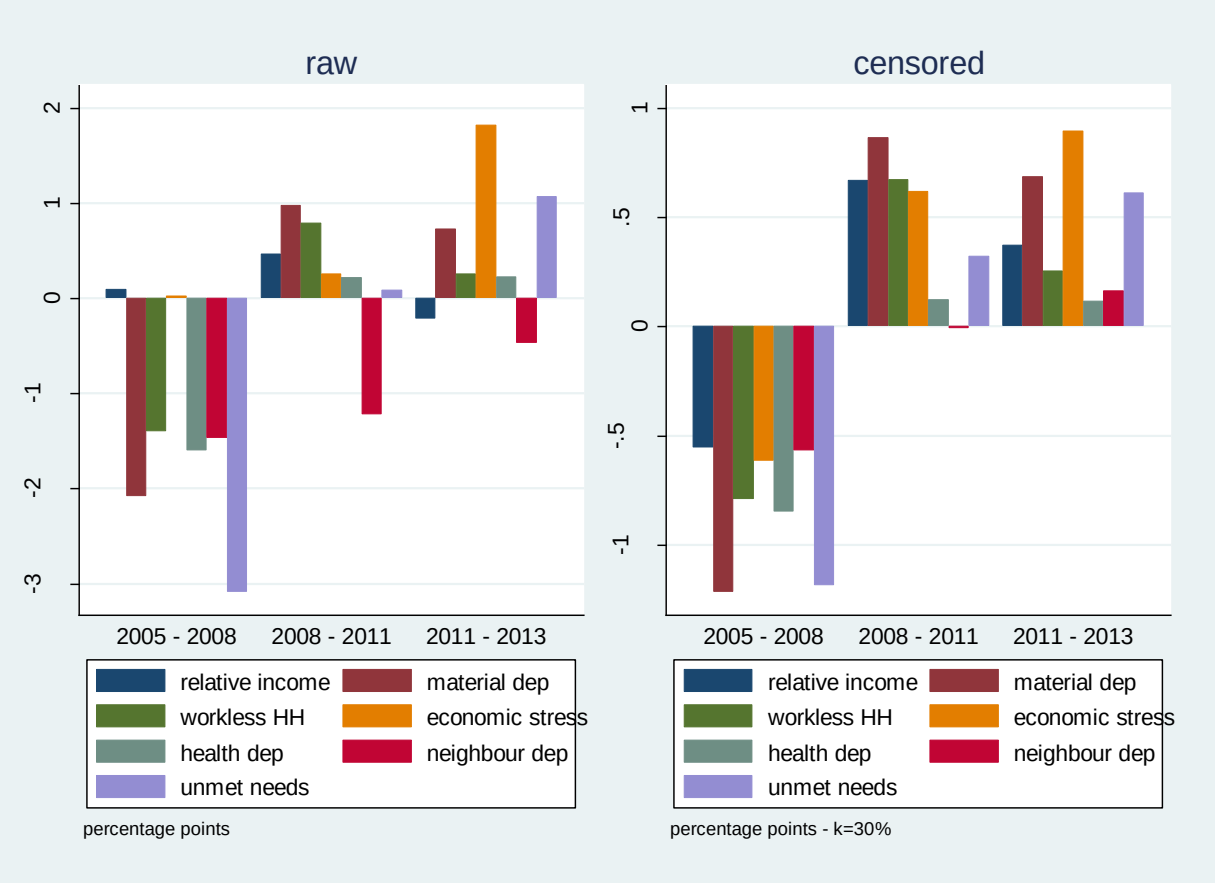
household. This is to suggest that while deprivation on multiple deprivations may be more severe and thus deserve priority over deprivation on single dimensions, the latter, when related to some key dimensions, should be given some weight too.

The empirical argument is that censored headcounts are in many cases not good proxies for raw headcounts. Specifically, trends in censored headcounts are typically considerably more consistent, and less 'noisy', than are trends in raw headcounts. To illustrate this, in Figure 11, we provide a comparison of censored headcounts for each of the dimensions on the right side (which is reproduction of Figure 3 above) and, on the left side, using the equivalent raw headcounts.

The differences are not trivial. When looking at raw headcounts, we see that income poverty and economic stress do not fall in the pre-crisis period, and neighbourhood deprivation does fall in both periods of the crisis. The 'noisier' nature of raw headcounts is also observed on the country-disaggregated data (not shown here).

These arguments suggest that while censored headcounts are an important development in enabling analysts to move between aggregated and disaggregated analysis – which in itself marks a major contribution to the field – raw headcounts continue to be of importance and should not be overlooked in multidimensional poverty analyses.

Figure 11. Comparison of raw and censored headcounts



9. Conclusion

In this paper we have sought to investigate the impact of the Great Recession on poverty and deprivation in Europe. To do so, we have examined rates of multidimensional poverty at four times points, capturing the period immediately preceding the crisis as well as the years since the Great Recession began. The Alkire Foster measure we have employed has enabled us to examine not just where poverty and deprivation are experienced, but also, by enabling disaggregation by dimension, *how* they have been experienced in each nation.

The analysis shows that the pre-crisis period was associated with quite substantial reductions in multidimensional poverty – especially at higher multidimensional thresholds. However, the disappointing performance of the Southern European nations, even before the crisis begins, stands out in stark contrast to this general trend. These nations failed to benefit from the reductions in multidimensional poverty that were experienced elsewhere between 2005 and 2008. These pre-crisis years also saw a reduction in the variation of multidimensional poverty between Member States as the greatest reductions in the pre-crisis years were experienced in the nations with the highest initial poverty rates.

We have examined the crisis in two phases, from 2008 to 2011 and then from 2011 to 2013. In the first phase, the proportion of the population who experience *any* form of deprivation considered here does not rise, but the proportion experiencing multiple forms of deprivation does increase. Multidimensional poverty at 3 or more dimensions increases by 10% in the Member States considered here, and increases in multidimensional poverty were experienced in 19 of the 24 Member States considered here.

In the second phase of the crisis, between 2011 and 2013, multidimensional poverty continues to rise, but this increase is no longer so consistently experienced across Member States. Indeed, for ten Member States poverty falls during this period, but for others – and especially for the bailout nations – it continues to rise sharply. The paper thus demonstrates the substantial increase in multidimensional poverty in those countries where austerity policies were externally imposed. The cumulative effect of these three periods means that, by 2013, Greece exhibits the highest multidimensional poverty rates in Europe. However, we must also be cognisant of the fact that EU Member States vary significantly in terms of their population size. We therefore find that, in 2013, a greater proportion of people experiencing multidimensional poverty in Europe live in Italy than in any other Member State.

The European crisis is ongoing, but is now concentrated within certain Member States. These states are not exclusively nations with high initial rates of multidimensional poverty, which explains why the variation in Member States' multidimensional poverty rates has not risen sharply during the Great Recession. However, these recent trends are significant because they point to a changing geography of poverty within the European Union, increasingly concentrated away from the East, and towards the South.

REFERENCES

Alkire, S., Foster, J., Seth, S., Santos, M.E., Roche, J.M. and Ballon, P. (2015), *Multidimensional Poverty Measurement and Analysis*, Oxford, Oxford University Press.

Alkire Sabina and James Foster, 2011. "Counting and Multidimensional Poverty Measurement", Journal of Public Economics, 95 (7), 476-487.

Alkire Sabina and Maria Emma Santos (2010). "Acute Multidimensional Poverty: A New Index for Developing Countries", ophi Working Paper N8 38, Oxford.

Alkire, S. and Sumner, A. (2013), 'Multidimensional poverty and the post-2015 MDGs', Oxford, OPHI.

Alkire, S., Apablaza, M., and Jung, E. (2014), 'Multidimensional poverty measurement for EU-SILC countries', OPHI Research in Progress series 36c, Oxford, Oxford Poverty and Human Development Initiative.

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

Bradshaw, J., Hoelscher, P., & Richardson, D. (2007). An index of child well-being in the European Union. *Social Indicators Research*, *80*(1), 133-177.

Burchardt, T. and Vizard, P. (2011). Operationalising" the capability approach as a basis for equality and human rights monitoring in twenty-first century Britain. *Journal of Human Development and Capabilities*, 12(1), 91–119.

Chzhen, Y., de Neubourg, C., Plavgo, I., de Milliano, M. (2015), 'Child poverty in the European Union: the Multiple Overlapping Deprivation Analysis approach (EU-MODA)', *Child Indicators Research*, Online First.

Coromaldi Manuela and Mariengela Zoli, (2012). "Deriving Multidimensional Poverty Indicators: Methodological Issues and an Empirical Analysis for Italy" Social indicators research, 107 (1): 37-54.

Eurostat (2010), '2008 Comparative EU Intermediate Quality Report, Version 2 – June 2010'. http://ec.europa.eu/eurostat/documents/1012329/6064601/2008+EU-IQR.pdf/7f7fe76e-0d20-457f-ac02-db5d330f27aa

Ferreira Fransisco and Maria Ana Lugo, (2013). "Multidimensional Poverty Analysis: Looking for a Middle Ground", The World Bank Research Observer, lks013.

Foster, J., Greer, J., & Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica: Journal of the Econometric Society*, 761-766.

Hick, R. (forthcoming), 'Between income and deprivation in the UK: In search of conversion factors', *Journal of Human Development and Capabilities*.

Hick, R. (2015), 'Material poverty and multiple deprivation in Britain: the distinctiveness of multidimensional assessment', *Journal of Public Policy*, FirstView, pp. 1-32.

Hick, R. (2014), 'Poverty as capability deprivation: Conceptualising and measuring poverty in contemporary Europe', *European Journal of Sociology*.

Hick, R. (2013), 'Poverty, Preference or Pensioners? Measuring Material Deprivation in the UK', *Fiscal Studies*, *34*(1), 31-54.

Hick, R. (2012), 'The capability approach: insights for a new poverty focus', *Journal of Social Policy*, *41*(02), 291-308.

Hick, R. and Burchardt, T. (forthcoming), 'Capability Deprivation', in Burton, L.M. and Brady, D. (eds.), *The Oxford Handbook of the Social Science of Poverty*, Oxford, Oxford University Press.

Nolan, B. and Whelan, C.T. (2011a), *Poverty and Deprivation in Europe*, Oxford, Oxford University Press.

Nolan, B. and Whelan, C.T. (2011b), 'The EU2020 poverty target', GINI Discussion Paper No. 19, Amsterdam, AIAS.

Ravallion Martin, (2011). "On Multidimensional Indices of Poverty", Journal of Economic Inequality, 9 (2): 235-248.

Santos, M.E. and Alkire, S. (2011), 'Training material for producing national human development reports: The Multidimensional Poverty Index (MPI)', Oxford, OPHI.

Saunders, P. (2015), 'Social inclusion, exclusion, and well-being in Australia: meaning and measurement', *Australian Journal of Social Issues*, 50, 2, pp. 139 – 157.

Sen, A. (2009), *The Idea of Justice*, London, Allen Lane.

Sen, A. (1999), *Development as Freedom*, Oxford, Oxford University Press.

Sen, A. (1992), *Inequality Re-examined*, Cambridge, Massachusetts, Harvard University Press.

Suppa, N. (2015), 'Towards a multidimensional poverty index for Germany', United Nations Economic Commission for Europe, Working Paper 27.

Townsend, P. (1979), *Poverty in the United Kingdom: A Survey of Household Resources and Standards of Living*, Middlesex: Penguin.

Wagle Udaya R., 2008. "Multidimensional Poverty: An Alternative Measurement Approach for the United States?", Social Science Research, 37 (2): 559-580.

Whelan, C.T., Nolan, B. and Maitre, B. (2014), 'Multidimensional poverty in Europe: An application of the adjusted headcount approach', *Journal of European Social Policy*, 24, 2, pp. 183 – 197.

APPENDICES

Figure A1. Coefficient of variation of values of *Mo* by Member State over time

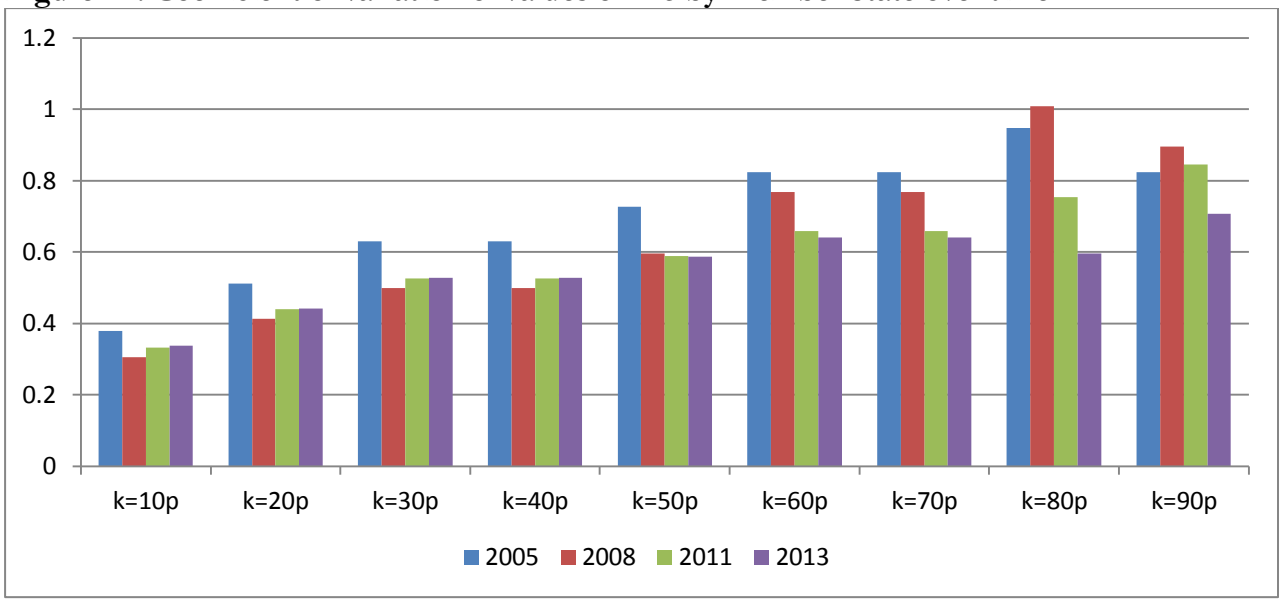


Figure A2. *Mo* by welfare regime using different thresholds of the multidimensional headcount, 2013

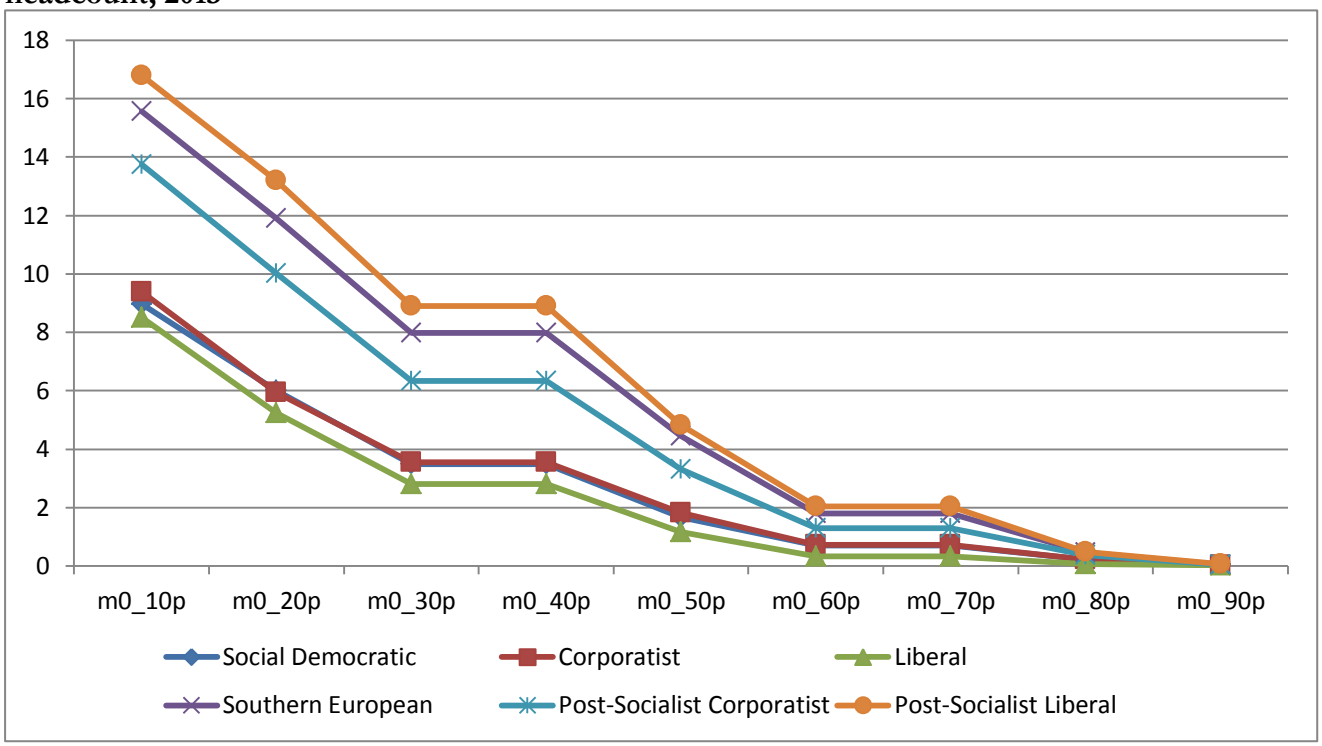


Figure A3. Change in M_0 by welfare regime over time

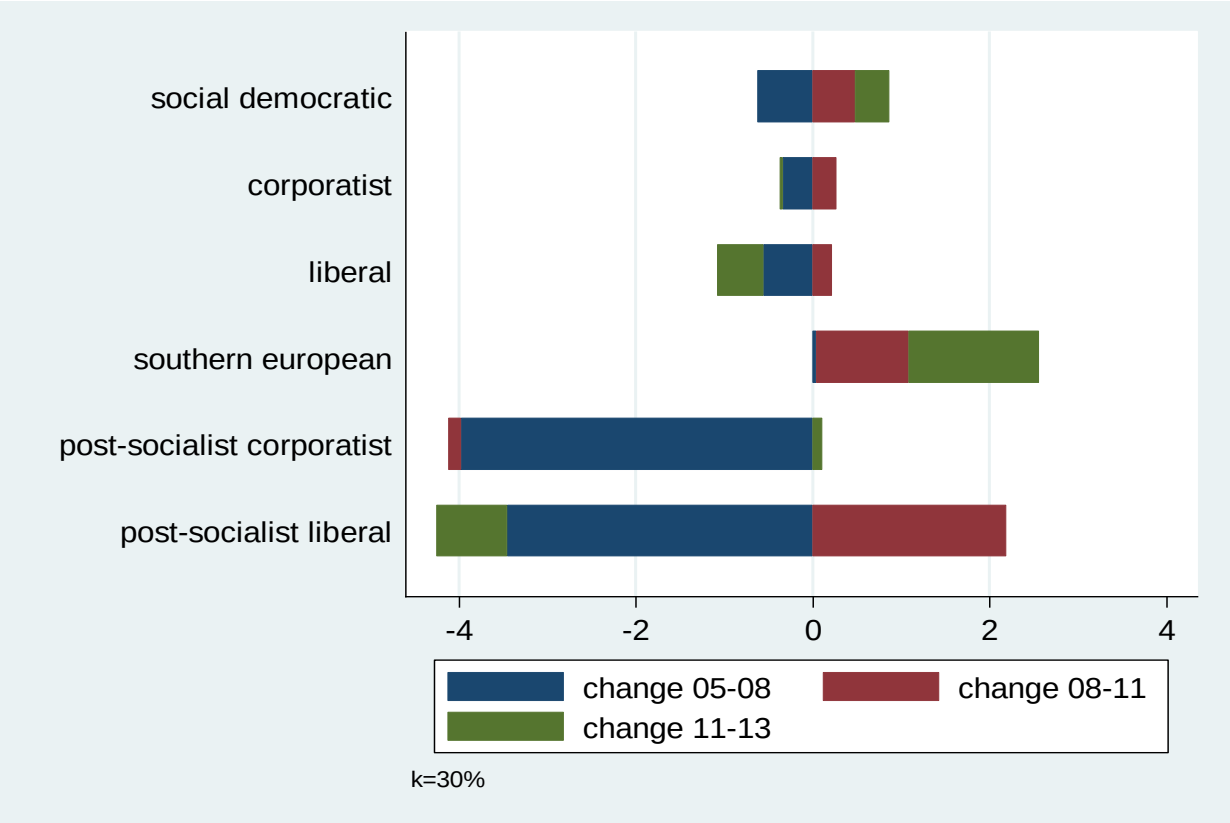


Figure A4. Change in contribution by welfare regime, 2005 & 2013