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Understanding Material Deprivation in Europe: A Multilevel Analysis

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Abstract

In this paper, taking advantage of the inclusion of a special module on material deprivation in EU-SILC 2009, we provide a comparative analysis of patterns of deprivation. Our analysis identifies six relatively distinct dimensions of deprivation with generally satisfactory overall levels of reliability and mean levels of reliability across counties. Multi-level analysis based on 28 European countries reveals systematic variation across countries in the relative importance of with and between country variation. The basic deprivation dimension is the sole dimension to display a graduated pattern of variation a across countries. It also reveals the highest correlations with national and household income, the remaining deprivation dimensions and economic stress. It comes closest to capturing an underlying dimension of generalized deprivation that can provide the basis for a comparative European analysis of exclusion from customary standards of living. A multilevel analysis revealed that a range of household and household reference person socio-economic factors were related to basic deprivation and controlling for contextual differences in such factors allowed us to account for substantial proportions of both within and between country variance. The addition of macro-economic factors relating to average levels of disposable income and income inequality contributed relatively little further in the way of explanatory power. Further analysis revealed the existence of a set of significant interactions between micro socio-economic attributes and country level gross national disposable income per capita. The impact of socio-economic differentiation was significantly greater where average income levels were lower. Or, in other words, the impact of the latter was greater for more disadvantaged socio-economic groups. Our analysis supports the suggestion that an emphasis on the primary role of income inequality to the neglect of differences in absolute levels of income may be misleading in important respects.

Introduction

Research on poverty in rich countries relies primarily on household income to capture living standards and distinguish those in poverty, and this is also true of official poverty measurement and monitoring for policy-making purposes in those countries. However, awareness has been increasing of the limitations of income and increased attention has been focused on the role which non-monetary measures of deprivation can play in improving our measurement and understanding of poverty, and contributing to the design of more effective anti-poverty strategies and policies. This is true when one focuses on an individual country, but even more so when the perspective is comparative (Nolan and Whelan, 2011, Guio et al 2009). This is reflected in the inclusion of deprivation indicators in the EU 2020 Poverty Target.

Poverty is generally viewed as having two core elements: it is about inability to participate that is attributable to inadequate resources (Citro and Michael, 1995, Townsend, 1979). Most quantitative research then employs income to distinguish the poor (OECD, 2009). In parallel, though, non-monetary indicators of living standards and deprivation have also been developed and investigated for many years. A key justification for their use is the increasing evidence that low income fails in practice to identify those who are unable to participate in their societies due to lack of resources (Callan et al, 1993, Hallerod, 1996, Ringen, 1987, 1988, Mack and Lansley, 1985). However, such indicators have also been employed to develop the argument that poverty is 'not just about money' and to underpin the case that social exclusion is distinct from and broader than poverty, or that the underlying notion of poverty that evokes social concern is itself intrinsically multi-dimensional and about more than income. (Nolan and Whelan, 2007, Burchardt, Le Grand. and Piachaud, 2002) In either case, a variety of non-monetary indicators come into play in seeking to capture such multidimensionality.

The European Union as a whole has been grappling with how best to learn from research and incorporate a multidimensional perspective into policy design and the monitoring of outcomes. Since 2000 the Social Inclusion Process has had at its core a set of indicators designed to monitor progress and support mutual learning that is explicitly and designedly multidimensional. The need for such an approach has become even more salient with the enlargement of the EU from 2004 to cover countries with much lower average living standards, sharpening the challenge of adequately capturing and characterising exclusion across the Union (Alber *et al* 2007). The difference from richest to poorest member states in terms of average income per head is now very much wider than before. Widely used income poverty thresholds in the more affluent member states are higher than the average income in the poorest member states, and those below them have higher standards of living than the well-off in the poorest countries. The strikingly different picture produced by these 'at risk of poverty' indicators compared with average GDP per head, and unease with the current EU practice of keeping entirely distinct concerns about the divergence in living standards across versus within countries, helps to motivate interest in moving beyond relying entirely on relative income. (Brandolini, 2007, Fahey, 2007)

Despite widespread interest in a multidimensional perspective and an increasing volume of research, only limited progress has been made in teasing out how best to apply it in practice in the EU [i]This state of affairs reflects limitations in the information available, but also in the conceptual and empirical underpinnings provided by existing research. The widespread adoption of the notion of multidimensionality has not meant greater clarity about precisely what that is intended to mean or why it would be preferable to low income as a focus. Some discussions highlight that the *processes* giving rise to poverty are multifaceted and cannot be reduced to low income and its proximate causes: poverty in the highly complex societies of the industrialised world can only be understood by taking a variety of causal factors and

channels into account. Others focus more on *outcomes*, emphasising that low income and its correlates are only one aspect of the variety of exclusions that one would wish to empirically capture, understand and address.

Among the key issues requiring further detailed exploration are the following:

- What is the relationship between different deprivation dimensions and national and household measures of income?
- What are the relative importance of between and within country sources of variation in deprivation in European and what implications do the answers to this question have for the geographical level at which we analyse poverty and social exclusion? (Fahey, 2007, Whelan & Maître 2009).
- Which dimensions of deprivation can most fruitfully be used as measures of 'generalised' deprivation that can contribute to enhancing our understanding of poverty and social exclusion understood as "exclusion from ordinary living patterns, customs and activities (Townsend, 1979:31) and assist in identifying those "whose resources ------- are so limited as to exclude them from a minimum acceptable way of life in the EU Member States in which they live? (European Economic Communities, 1985).
- What role do household and national characteristics play in explaining deprivation outcomes? Does the impact of the former vary across country? What role do average income levels and degree of income inequality play in relation to material deprivation? What are the implications for our understanding of the impact of social policy?

Data

In this paper we make use of the 2009 wave of EU-SILC which includes a special module on materials deprivation. The availability of this module allows us to explore the dimensionality of deprivation. Portugal has been excluded from our analysis because of missing values on key variables. Our analysis therefore covers 28 countries comprising 26 European Members together with Norway and Iceland. The total number of households in our analysis is 205,226.

Our analysis is this survey is based at the household level and we focus on household and Household Reference Person (HRP) characteristics. The HRP is the individual responsible for the accommodation. Where more than one such person bears this responsibility we choose the oldest person. Our analysis makes use of 27 measures of deprivation details of which are provided in the next section. Where questions have been addressed to individuals we have assigned the value for the HRP to the household. [ii]

Measuring Deprivation

Dimensions of Deprivation

In Table 1 we set out the results of an exploratory factory analysis. Our analysis was influenced by earlier studies of dimensionality relating to both the European Community Household Panel Study (ECHP) and EU-SILC (Fusco et al 2010, Whelan et al 2001, Whelan and Maître, 2007). The solution takes an oblique form in which the factors are allowed to be correlated. To facilitate interpretation factor coefficients are reported only for the factor on which the item has the highest loading.[iii] Six relatively distinct dimensions are identified. Each of these factors has an eigenvalue greater than one in the initial solution and together they account for 53.2% of the total variance.[iv] The six factor solution is our preferred solution on the grounds of substantive interpretability. The dimensions identified are as follows.

Basic Deprivation which comprises items relating to enforced absence of a meal, clothes, a leisure activity, a holiday, a meal with meat or a vegetarian alternative, adequate home heating, shoes. This dimension captures enforced deprivation relating to relatively basic items. It is dimension that that has obvious content validity in relation to the objective of capturing inability to participate in customary standards of living due to inadequate resources. It bears a striking resemblance to the 'basic deprivation' measure employed in Ireland as one part of the national consistent poverty measure. (Whelan, 2007) The factor loadings range from 0.761 for the leisure item to 0.412 for the shoes item. Our expectation is that, since households will to considerable length to avoid deprivation on these items, the dimensions will be significantly affected by measures of current and longer term resources.

Consumption Deprivation comprises three items relating a PC, a car and an internet connection. It is obviously a rather limited measure and it would be preferable to have a number of additional items. Our expectation is that the association with current resources will be weaker than in the case of basic deprivation since the items do not necessarily reflect capacity for current expenditure. The factor loadings range from 0.880 for a PC to 0.627.

Household Facilities This dimension is measured by five items relating to a bath and shower, indoor toilet, hot running water, a washing machine. Since these items represent extreme forms of deprivation reflecting long-standing household facilities rather than current consumption, we again expect that a strong association with variables tapping both current and longer term resources will be observed. However, in this case levels of deprivation are likely to be extremely modest in the more affluent countries with implications for the amount of variation that can be observed. As a consequence conclusions relating to the measure need be treated with some caution. The factor loadings range from 0.911 for the bath or shower item to 0.382 for a washing machine.

Table 1: Exploratory Oblique Factor Analysis

	Basic	Consumption	Health	Neighbourhood Environment	Household Facilities	Access to Public Services
HRP_leisure	.761					
HRP_meal	.750					
HRP_money	.747					
HRP_clothes	.728					
Replace furniture	.761					
Holiday	.636					
Meals with meat, etc	.604					
Home adequately warm	.516					
Shoes	.412					
PC		880				
Internet connection		.862				
Car?		.627				
Litter				.693		
Damaged public amenities				.661		
Pollution,				.646		
Crime/violence/vandalism				.625		
Noise				.585		
Bath or shower					.911	
Indoor toilet					.903	
hot running water					.835	
Washing machine ?					.494	
Telephone					.382	
HRP limited activity			.866			
HRP Ill			.840			
HRP Health Status			.764			
Accessibility of public transport						0.856
Accessibility of postal or banking services						0.833

Health This dimension is captured by three items relating the health of the HRP. These include current health status, restrictions on current activity and the presence of a chronic illness. Given the importance of age in relation to health we anticipate a more modest

correlation with economic resources. The factor loadings range from 0.866 for limited activity to .764 for current health status.

Neighbourhood Environment This captures the quality of the neighbourhood/area environment with a set of five items that include litter, damaged public amenities, pollution, crime/violence/vandalism and noise. Given the importance of urban/rural residence and location within urban areas in relation to such deprivations, a much weaker association with resource factors can be expected. The factor loadings range from 0.693 for litter to 0.585 for crime etc.

Access to Public Facilities This measure comprises two items relating to access to public transport and postal banking services. The loading for the former is 0.856 and for the later 0.833. Again since geographical factors are likely to play a prominent role, other forms of socio-economic differentiation are likely to be correspondingly weaker.

Reliability Analysis

In Table 2 we look at the reliability levels for each of the dimensions and the extent to which these levels vary across counties. Reliability relates to the extent to which individual items are tapping the same underlying phenomenon. To assess this we make use of Cronbach's coefficient alpha and estimate reliability coefficients for each dimensions. [v]The alpha levels for the basic and household facilities are respectively .850 and .795. For health the level is .762. For access to public facilities and neighbourhood environment the levels fall slightly to .658 and 0.633 respectively. The average alpha across counties differs very little from the overall alpha for basic, health and neighbourhood environment. For household facilities the average across counties is a good deal lower at 0.550. This reflects the unsatisfactorily low levels of reliability in countries such as Denmark, Sweden, Norway, Iceland and Germany. For access to public facilities the reduction from .658 to 0.570 is a consequence of rather low rates in counties such as Denmark, Norway, Finland, Iceland, France, Cyprus and the UK.

Table 2: Reliability of Deprivation Dimensions and Economic Stress		
	Overall Alpha	Average Alpha
Basic	0.850	0.800
Consumption	0.711	0.610
Household Facilities	0.795	0.550
Neighbourhood Environment	0.633	0.610
Health of HRP	0.762	0.750
Access to Public Facilities	0.658	0.570

Correlations between the Deprivation Dimensions

In constructing measures relating to each of these dimensions we have used prevalence weighting across the range of counties included in our analysis. This involves weighting each component item by the proportion of households as whole possessing an item or not experiencing the deprivation depending on the format of the question. In other words, deprivation on widely available item or experience of a disadvantage that is relatively rare is treated as more serious than a corresponding deprivation on an item where absence or disadvantage is more prevalent. This implicitly involves a "European" reference point in relation to deprivation with a particular magnitude of deprivation being treated uniformly across counties. This is appropriate since we are interested in both within and between country variation and we wish to avoid any procedure that by definition reduces such variation. In a final step we standardise scores on each of these dimensions so that they have a potential range running from 0 to 1. The former indicates that the household is deprived in relation to none of the items included in the index while the later indicates that they experience deprivation in relation to all of the items.

In Table 3 we show the correlations between the deprivations dimensions calculated in this fashion. The correlations between the neighbour environment and access to public facilities and the remaining dimensions are extremely modest.[vi] The highest correlation is 0.115 with little more than one per cent of the variance being explained in any of these cases. A

somewhat higher correlation of 0.292 is observed between consumption and health. The largest correlation of 0.464 is observed between basic and consumption deprivation and followed by one of 0.367 with household facilities. The deprivation dimensions are clearly relatively independent of each other. The basic deprivation dimension is distinctive in displaying the highest correlation with each of the remaining dimensions providing evidence of its capacity to tap into generalised deprivation. However, as the magnitude of the correlations suggest, multiple deprivation on any combination of the dimensions will be a great deal modest than the level for basic deprivation as such. What we observe is a modest pattern of interrelated risk rather than strongly overlapping patterns of deprivation leading to high levels of multiple deprivation.

Table 3: Correlations Between Deprivation Dimensions

	Basic	Consumption	Health	Household Facilities	Neighbourhood Environment
Basic					
Consumption	0.464				
Health	0.214	0.095			
Household Facilities	0.367	0.292			
Neighbourhood Environment	0.144	0.093	0.069	0.015	
Access to Public Facilities	0.115	0.053	0.115	0.124	-.008

Deprivation Levels by Country

In Table 4 we show the intra-class correlation coefficients (ICC) for clustering by countries. The ICC captures the between cluster variance as a proportion of the total variance. It can also be interpreted as the expected correlation between two randomly drawn units from the same cluster. (Snijders and Bosker, 1999).

Focusing first on the findings relating to between counties differences, we find that between cluster variation is extremely modest for neighbourhood environment, health and access to public facilities with the proportions of variance running from 0.041 for the public facilities

dimension to 0.024 and 0.023 for the neighbourhood environment and health . Taken together with our earlier findings, these results show that explaining these forms of deprivation requires a focus almost exclusively on within country variation and on factors that are distinct from those invoked for the remaining three dimensions. For consumption the ICC rises to 0.110. The sharpest levels of cross- country variation are observed for basic deprivation and household facilities with respective ICCs of 0.288 and 0.311.

The two dimensions that exhibit the most substantial between county differences are basic deprivation and household facilities. They are also, as can be seen from Table 4, the dimensions that that are most highly correlated with the log of gross national income per head (GNDH) with the respective correlations of -0.400 and -0.371. For consumption deprivation it falls to -0.234 and for the remaining dimensions it is in each below -.100. An important difference between the basic and housing facilities dimensions is that while for the former we observe a gradual increase in deprivation as national income declines this is not the case for the latter. Instead we observe levels close to zero for many countries and a striking contrast between the vast majority of countries and a sub-set of post-communist countries most particularly Bulgaria and Romania. This is reflected in the fact that the ICC for the contrast between Bulgaria and Romania and all other counties is .209 for basic deprivation but rises to .393 for household facilities. Unlike the basic deprivation scale the household facilities index is of very limited values in facilitating differentiated comparisons across the full range of European welfare regimes or countries.

Table 4: Mean Deprivation Levels by Country						
	Basic	Consumption	Neighbourhood Environment	Health	Housing Facilities	Access to Public Facilities
Country Intra Class Correlation Coefficient	0.257	0.093	0.041	0.024	0.311	0.023
Intra Class Correlation Bulgaria & Romania v Rest	0.209				0.395	
Pearson correlation with log GNDH	-0.400	-0.234	-0.371	-0.087	-0.371	-0.065

Deprivation, Household Income and Economic Stress

Up to this point we have shown that the basic deprivation index is highly reliable, shows substantial and graduated variation across counties and is the dimension most highly correlated with other deprivation dimensions and gross national income per head. Before proceeding to focus on this dimension in the remainder of the paper, we provide further justification for so doing. Interest in the construction of deprivation measures has been closely related to developing indicators that allow us to complement income measures and enable us to enhance our understanding the manner in which poverty and social exclusion are experienced. If our interest is in capturing exclusion from customary pattern of living due to lack of resources what we require is a measure or measures of deprivation that are significantly related to but by no means identical to income. In column two of Table 5 we show the correlation between the log of equivalised household income and each of the deprivation dimensions. The strongest correlation of -0.541 is with basic deprivation. Income and basic deprivation are strongly related but clearly distinct phenomena. The next strongest correlation of -0.439 is with housing facilities followed by one of -0.344 with consumption. The remaining correlations are extremely modest with values ranging from -0.150 for health to -0.065 for access to facilities.

One test of the validity of a deprivation indicator that we wish to employ as part of our efforts to understand national and cross-national patterns of poverty and social exclusion is that it should be related in the expected manner to patterns of subjective economic stress. In column three we show the relationship between each of the measures of deprivation and an index of economic stress. This indicator is a weighted prevalence measure standardised for scores to run from 0 to 1 constructed from a set of dichotomous items relating to difficulty in making ends meet, inability to cope with unanticipated expenses, arrears and housing costs being a burden. [vii]The Cronbach alpha reliability for the scale involving these items is 0.70 and the average reliability is also 0.70. From Table 5 we can see that highest correlation with economic stress of 0.647 is with basic deprivation. The next highest value of 0.360 is associated with consumption deprivation. The remaining associations are relatively modest and are close to 0.2 for household facilities before falling to close to zero for access to public facilities.

The basic deprivation measure therefore provides us with a measure that is highly reliable across counties, displays variation across the full range of counties, captures generalized deprivation most successfully and bears the strongest relationship of any of the deprivation indicators to both national and household income and subjective economic stress. In the analysis that follows we focus exclusively on this dimension and seek to explore the role of both micro and macro variables in accounting for within and between country variation.

Table 5: Correlation between Log of Equivalent Income and Economic Stress and Deprivation Dimensions

	Correlations	
	Log of Equivalent Income	Economic Stress
Basic	-0.541	0.647
Consumption	-0.344	0.360
Household Facilities	-0.439	0.201
Health	-0.150	0.171
Neighbourhood	-0.086	0.167
Access to Public facilities	-0.065	0.009

Correlation of Basic Deprivation with Macro Variables

Before proceeding to multivariate analysis of the micro and macro factors associated with basic deprivation we extend our analysis relating to the degree of association between such deprivation and macro-economic factors. Kenworthy et al (2011) having established that in most counties economic growth has led to rising incomes for low end households, poses the question of whether growth has been similarly helpful in reducing material deprivation. Employing a 7-item material deprivation index developed by Boarini and d'Ercole (OECD, 2008) they examine the relationship between material deprivation and GDP per capita and social policy generosity for fifteen countries comprising a number of the more affluent counties together with Australia and the US.[viii] They found no association to speak of between per capita GDP and material deprivation. However, they found a significant relationship between social policy generosity, as captured by government social expenditure as a percentage of GDP (GSP) and material deprivation.

In Table 6 we look at the relationships of selected macro-economic variables to the basic deprivation index. We also report the correlations for Gross National Disposable Income per capita (GNDH) and GINI.[ix] Unlike Kenworthy et al (2011), we find a clear association of -0.396 between our deprivation measure and GDP per capita. A similar association of -0.400 is observed between the GNDH measures which is very closely correlated with GDP. We also observe a significant correlation of -0.312 for the GSP measure. Finally, we observe a correlation of -0.192 for GINI.

Table 6: Correlations between Basic Deprivation and Macro Variables	
GDP per capita	-0.396***
Gross National Disposable Income Per Capita (GNDH)	-0.400***
Government Social Expenditure as % of GSP (GSP)	-0.213**
GINI	0.192***
*** p < .001	

In the analysis that follows we focus on GNDH as our preferred measure of absolute living standards but given that it is almost perfectly correlated with the GDP measure substituting the latter would have little effect on our conclusions. Further analysis revealed that adding the GSP measure to GINI provided little in the way of additional explanatory power. This has the advantage of allowing us to connect to a wider sociological literature relating to the impact of absolute income differences and income inequality (Wagstaff and Doorsalter, 2000, Wilkinson and Pickett, 2009). While it is possible to assess the extent to which particular variables add to our explanatory power, it is clear that a cross-sectional analysis with only 28 macro units cannot provide the basic for a causal analysis of a set of highly correlated macro variables.

Micro and Macro Influences on Basic Deprivation

In Table 7 we present a set of hierarchical multilevel regressions. These equations are appropriate to a population with a hierarchical structure where individual observations within higher level clusters, such as countries, are not independent. Taking into account such clustering allows to avoid "the fallacy of the wrong level" involved in analysing data at one level and drawing conclusions at another and, in particular, ensures that we do not fall prey to the ecological fallacy (Hox, 2010).

The first equation involving the so called empty model does not included any independent variables. The intra-class correlation coefficient (ICC) for this model is 0.257. In model (ii) we add income and a range of socio-demographic variables. A very clear and systematic pattern of variation is observed across socio-demographic groups. In addition to the income effect, those drawn from lower social classes, less educated groups, the unemployed and those with a disability, women, lone parents, those separated/widowed/divorced, those in the middle of the life-course, having three or more children, being non-European and tenants are likely to be more deprived. These relationships are all highly significant and the patterns of differentiation are entirely consistent with our understanding of the latent dimension of generalized deprivation that the deprivation index is tapping. This model reduces the ICC to 0.084. It reduces the country variance by 0.801, the individual variance by 0.204 and the overall variance by 0.357. Thus not only does this set of socio-demographic variables account for a substantial portion of within country variance in basic deprivation but by controlling for cross-country compositional differences in relation to such factors it accounts for four fifths of the between country variance.

In equation (iii) we enter the macro variables GNDH and GINI without any micro variables. When we do so the coefficient for GINI is not significant and it adds little to the explanatory power of the GNDH measure. The macro variables account for 0.774 of the between country variance and consequently 0.073 of the total variance. In equation (iv) we enter both the household and HRP characteristics and GNDH. The micro coefficients are identical to those in equation (ii) but the net effect of log GNDH declines from -0.253 to -0.068. Entering GNDH increase the proportion of between country variance explained from 0.801 to 0.837 and the total variance accounted for from 0.357 to 0.367. However, it produces only the most marginal reduction in log likelihood ratio estimate. The introduction of macro variables adds almost nothing to the explanatory power of the micro variables.

Our analysis to this point assumes that macro and micro-factors combine in an additive fashion. However, one plausible hypothesis is that the impact of socio-economic factors on basic deprivation is contingent on the level of income in the society. In that case levels of deprivation will differ between more and less affluent societies not only because of compositional differences relating to a range of socio-economic factors but also because the consequences of socio-economic disadvantage for the level of basic deprivation experienced by households are greater the lower the average level of disposable income in a country. In equation (v) we allow for interaction between GNDH and a range of micro socio-economic attributes. The findings reported in equation (v) make it abundantly clear that the role of both micro and macro variables cannot be understood independently of each other. The consequences of being in a lower social class are crucially dependent on the level of GNDH in the respondent. The impact of the HRP being in a lower social class, lacking educational qualifications, being unemployed, having three or more children and marital disruption increases as the log of GNDH declines. Put another way, the impact of lower GNDH is significantly greater for more disadvantaged socio-economic groups than for those more favoured. There is no one set of country differences. The consequences of being in a country with low income is significantly affected by the HRP's social class[x], educational qualifications, labour market position, marital and parental status, housing situation. Cross-national differences in basic deprivation will be significantly greater among disadvantaged groups than for their more favoured counterparts as a consequence of substantially sharper patterns of social stratification in less prosperous counties. The variables included in equation five account for 0.855 of the cross-national variance, 0.214 of the within country variance and 0.379 of the total variance. The log likelihood ratio is reduced by 2,698.2 for the addition of 10 degrees of freedom. Thus taking into account both compositional differences in relation to key socio-economic factors and the differential impact of a number of key factors across

Table 7: Multilevel Random Intercept Model for Basic Deprivation: HRP and Macro Predictors					
	(i)	(ii)	(iii)	(iv)	(v)
Fixed Effects					
Log Income		-0.108***		-0.102***	-0.100***
Social Class					
Ref: Higher P & M & self-employed with employees					
Lower P & M		0.009***		0.009***	0.008***
Self-employed without employees		0.009***		0.009**	0.009***
Lower Non-Manual		0.016***		0.016***	0.014***
Farmers with employees		0.005***		0.005***	0.004 ns
Farmers without employees		0.019***		0.019***	0.016***
Lower Service & technical		0.046***		0.046***	0.044***
Routine		0.059***		0,059***	0.055***
Never worked		0.033***		0.033***	0.034***
Pre-primary		0.082***		0.082***	0.087***
Primary		0.046***		0.046***	0.050***
Lower secondary		0.034***		0.034***	0.036***
Higher secondary		0.010***		0.010***	0.013***
Separated/widowed/Divorced		0.022***		0.022***	0.021***
Female		0.020***		0.020***	0.020***
Non-European		0.044***		0.044***	0.044***
Age 30-44		0.028***		0.028***	0.028***
Age 50-64		0.045***		0.045***	0.041***
Age <65		0.014***		0.014***	0.013***
Number of children 3+		0.032***		0.032***	0.034***
Market tenant		0.045***		0.045***	0.049***
Other tenant		0.036***		0.036***	0.037***
Lone Parent		0.042***		0.042***	0.044***
Labour Force Status					
Unemployed		0.068***		0.068***	0.072***
Ill/Disabled		0.094***		0.094***	0.099***
Macro Variables					
Log GNDH (deviation from mean)			-0.253***	-0.068**	0.016 ns
GINI (deviation from mean)			0.044 ns		
Interactions					
Log GNDH* Farmers without employees					-0.028***
Log GNDH* Lower Service & technical					-0.055***
Log GNDH* Routine					-0.055***
Log GNDH* Never worked					-0.063***
Log GNDH*Primary					-0.094***
Log GNDH* Lower secondary					-0.100***
Log GNDH* Higher secondary					-0.053***
Log GNDH* Number of children 3+					-0.070***
Log GNDH *Separated/widowed/Divorced					-0.029***
Intercept	0.152	1.020	0.155	1.020	0.984
Random Effects					
Variance					
Country	0.013	0.003	0.003	0.002	0.002
Individual	0.038	0.030	0.038	0.030	0.030
Intra Class Correlation Coefficient	0.257	0.084	0.073	0.066	0.061
Reduction in country variance		0.801	0.774	0.837	0.855

Reduction in individual variance		0.204	0.000	0.204	0.214
Reduction in total variance		0.357	0.199	0.367	0.379
Log likelihood ratio	-44,404.8	67,608.6	-55,425.6	67,612.6	-68,860.8
N	203,795	203,795	203,795	203,795	203,795
*p < .1, ** p < .01, *** p < .001					

countries allows us to largely account for cross-country differences in levels of basic deprivation.

In further analysis we have examine the effect of allowing for a comparable set of interactions with GINI. While there is a tendency for the impact of some of the socio-economic characteristics to be stronger where GINI is higher, these effects are considerably weaker than in the case of GNDH. Adding the terms involving GINI to those included in equation (v) produces an extremely modest reduction of 82.1 in the log likelihood for 10 degrees of freedom. In contrast adding the GNDH terms to the equation involving the GINI interaction produces a reduction of 1,224.1.We explored this issue further by substituting for GINI in our analysis a measure proposed by Checci, Visser and Van de Werfhorst (2010) and Lancee and van de Werfhorst (2011) based on the Mean Distance to Median Income (MMDI) below the median which, by focusing on inequality at the lower end of the income distribution, might possibly capture effects on deprivation not captured by GINI. However, the equation involving the set of MMDI below the median terms produces a reduction in the log likelihood of only 100.4. The corresponding addition where the GNDH terms are added to the MMDI blow the median effects is 1,278.8.

In order to explore further the implications of our results in Table 8 we set out the gross effects of welfare regime differentiation and the net effects when the dummy variables for welfare regimes are entered after the full set of terms included in equation (v) in Table 7. The welfare regimes distinguished are as follows.

- The *social democratic regime* comprises Sweden, Denmark, Iceland, Finland, Norway and Netherlands.

- The *corporatist regime* includes Germany, Austria, Belgium, France and Luxembourg.
- The *liberal regime* is made up of Ireland and the UK
- The *southern European regime* comprises Cyprus, Greece, Italy, Portugal, Spain and Malta
- The *post-socialist corporatist regime* includes Czech Republic, Hungary, Poland, Slovenia and Slovakia are included in this cluster.
- The *post-socialist liberal regime* comprises the Baltic comprising Estonia, Latvia, Lithuania
- The *residual regime is* made up of Bulgaria and Romania

The gross effects are generally in line with expectations. With the residual regime as the reference category, the lowest level of deprivation is observed for the social democratic regime with a coefficient of -0.413. The level for the corporatist and liberal regimes differ very little with respective coefficients of -0.355 and -0.362. The level increases gradually across the remaining regimes. The welfare state dummies account for 0.861 of the country variance. However, when the welfare state dummies are entered after the terms entered in equation (v) of Table 7 they add little in the way of explanatory power. They reduce the value of the log likelihood by a mere 7.8 for the use of six degrees of freedom. The pattern of coefficient reflect a general tendency for all of the remaining welfare regimes to have lower levels of basic deprivation than the residual regime rather than any substantively interpretable pattern of welfare regime effects as such. In any event, only those relating to the post-communist cluster are significant beyond the 0.1 level.

Table 8: Multilevel Intercept Model for Welfare Regime Effects		
	Gross	Net (controlling for Household/HRP Characteristics, GDH & Interactions
Welfare Regime		
Social Democratic	-0.413***	-0.105*
Corporatist	-0.355***	-0.066 ns
Liberal	-0.362**	-0.100*
Southern European	-0.306***	-0.084*
Post-Communist Corporatist	-0.254***	-0.111***
Post-Communist Liberal	-0.208**	-0.110***
Intercept	0.452	1.072
Random Effects		
Variance		
Country	0.002	0.001
Individual	0.038	0.030
Intra Class Correlation Coefficient	0.046	0.036
Reduction in country variance	0.861	0.917
Reduction in individual variance	0.000	0.214
Reduction in total variance	0.221	0.395
-2 log likelihood	--44,432.5	-68.868.6.
N	20,795	203,795
*p < .1, ** p < .01, *** p < .001		

Conclusions

In this paper we have sought to take advantage of the special module on material deprivation in EU-SILC 2009 in order to enhance our understanding of the dimensionality of deprivation and the role of micro and macro factors in accounting for such deprivation. Our analysis identified six dimensions of deprivation which are only modestly correlated. Further analysis

established that it was possible to construct measures of such dimensions which displayed high levels of overall reliability and fairly uniform patterns of reliability across counties. The most important exception to this conclusion was in relation to the housing facilities dimension in more affluent counties arising from the extremely low numbers reporting such deprivation.

Analysis of deprivation levels across countries and revealed that for health, neighbourhood environment and access to public facilities variation was largely within counties and consequently analysis of such forms of deprivation requires a focus on factors that vary largely within counties. Consideration of the correlations of between deprivation dimensions indicated that such factors are largely independent of those that play an important role in relation to, for example, basic deprivation. For both basic deprivation and household facilities between country differences account for over a quarter of the total variance. However, in the latter case the major contrast is between the post-socialist and residual welfare regimes and all others and indeed between the latter and the remaining clusters. This raises issues about employing a measure for comparative purposes where scores approach zero for a number of countries. For basic deprivation dimension on the other hand variation is observed across the range of countries and our subsequent analysis focused on this dimension. Further justification for singling out this dimension was provided by the fact it is the form of deprivation most strongly associated with the remaining forms of deprivation and national and household income and economic stress.

A multilevel analysis showed that a broad range of socio-economic variables were associated with basic deprivation with the patterns of differentiation being entirely in line with our expectations in relation to factors such as social class, educational qualifications and labour market experience. Controlling for such differences in composition across counties allows us to account for eighty per cent of the cross-national variation. Adding gross national

disposable income per capita (GNDH) contributes very little in the way of explanatory power while the GINI measure is statistically insignificant once we control for GNDH. In order to understand the role of GNDH it is crucial to take into account the manner in which it interacts with a number of key HRP characteristics. An unambiguous pattern emerges whereby the impact of GNDH is significantly greater for less favoured socio-economic groups. Or looked at in another way, the impact of factors such as social class, education, labour market experience, family size and marital disruption is significantly more powerful in countries with low average income levels.

Our analysis suggests that variation in basic deprivation across the set of European counties on which we have focused is largely accounted for by cross-national variation in a range of socio-economic characteristics and the manner in which a sub-set of these influences interact with gross disposable national income.. Once we have taken these factors into account other macro characteristics provided no additional explanatory power. No comparable set of effects was observed involving GINI or the Mean Median Distance to the Median below the median Substituting other variables relating to generosity of social policy for GINI such as social expenditure as a percentage of GDP, in no way alters this conclusion. Given our findings it seems highly unlikely that further refinements of the social expenditure variable (Kenworthy et al, 2011) or the substitution of social benefits levels for social expenditure would significantly alter change the picture (Nelson, forthcoming).

What does this imply in terms of social policy? Kenworthy (2011: 15-16) in exploring whether growth is good for the poor concludes that for the seventeen counties involved in his analysis economic growth allowed policymakers to boost inflation adjusted benefit levels. None of the countries significantly increased the percentage of GDP going to social transfers during this period. This is line with our finding regarding the minimal direct role of GINI and generosity of social expenditure. However, as Kenworthy (2001:16) notes, whether or not to

pass on the benefits of economic growth is a policy choice and to points to evidence that countries with that were comparatively high in social policy generosity were most likely to do so. The evidence that we have presented in relation to the interaction of key socio-economic variables suggests that this "trickle down" effect has been fairly widespread in the counties in our analysis. However, our analysis also suggest that in addition to increasing levels of income being associated with a lessening of the impact of socio-economic circumstances, it is also associated with a restructuring of the distribution of favourable and unfavourable economic circumstances that has a substantial impact on cross-national differences in levels of basic deprivation.

Clearly it is not possible to disentangle such influences in a cross-sectional analysis. However, the gross effect of welfare regime clusters was entirely accounted for by the socio-economic factors on which we focused and their interaction with national income levels. However, our analysis supports the view put forward by Kenworthy (2011:1-4) that concern with inequality and relative poverty should not lead us to neglect the importance of absolute income levels. It is also consistent with the view that the currently fashionable emphasis on primary role of inequality rather than the role of material factors may be misleading in important respects. (Goldthorpe, 2009, Lynch et al 2000, Wilkinson and Pickett, 2009).

References

Alber, J., Fahey, T. and Saraceno, C. (2007). Introduction: EU enlargement and quality of life: The context and purpose of the book. In Alber, J. (Ed.) et al. *Handbook of Quality of Life in the Enlarged European Union.* Oxon: Routledge.

Boarini, R., & Mira d'Ercole, M. (2006). *Measures of material deprivation in OECD countries.* OECD Social Employment and Migration Working Papers No. 37. Paris: OECD.

Brandolini, D. (2007). Measurement of Income Distribution in Supranational Entities: the Case of the European Union in J. Micklewright and S. Jenkins (eds) *Inequality and Poverty Re-examined*. Oxford: Oxford University Press.

Burchardt, T., Le Grand, J., & Piachaud, D. (2002). Degrees of exclusion: Developing a dynamic, multidimensional measure. In J. Hills, J. Le Grand, & D. Piachaud (Eds.), *Understanding Social Exclusion* . Oxford: Oxford University Press

Callan, T., Nolan, B. and Whelan, C. T. (1993). Resources, deprivation and the measurement of poverty. *Journal of Social Policy*, 22, 141–172.

Checci, D., Visser, J. and van Der Werfhorst, H, (2010), Inequality and Union Membership: The Influence of Relative earnings and Inequality Attitudes', *british Journal of Industrial Relations,* 48: 84-108

Fahey, T. (2007). The case for an EU-wide measure of poverty. *European Sociological Review*, 23, 35–47.

Fusco, A, Guio, A-C and Marlier, E. (2010), 'Characterising the Income Poor and the Materially Deprived in European Countries', in A. B. Atkinson and E. Marlier (eds), *Inccome and Living Conditions in Europe*. Luxembourg: Publications Office of the European Union

Goldthorpe, J. H. (2009), 'Analysing Social Inequality: A Critique of Two Recent Contributions from Economics and Epidemiology', *European Sociological Review.* 26, 6, 731-744.

Guio, A.-C. (2009), *What can be learned from deprivation indicators in Europe?* Eurostat Methodologies and Working paper. Eurostat Luxembourg

Halleröd, B. (1995). The truly poor: Direct and indirect measurement of consensual poverty in Sweden. *Journal of European Social Policy*, 5, 111–129.

Hox, J. (2010). *Multilevel Analysis*: *Techniques and Applications*, Second Edition, Routledge: New York & Hove.

Lancee, B and van der Werfhorst, H. (2011), *Income inequality and Participation: A Comparison of 34 Counties*, GINI Discussion Paper 6

Lynch, J. et al (2004), 'Is income inequality a determinant of population health? (Parts 1 and 2), *Milbank Quarterly*, 82, 5-99 and 355-400.

Kenworthy, L. (2011), *Progress for the Poor*, Oxford: Oxford University Press

Kenworthy, L. Epstein, J and Duerr, D. (2011), 'Generous social policy reduces material deprivation' in L. Kenworthy, L. *Progress for the Poor*, Oxford: Oxford University Press

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

Nelson, K. (forthcoming), 'Counteracting material deprivation: the role of social assistance in Europe', *Journal of European Social Policy*

Nolan, B. and Whelan, C.T. (2007). On the multidimensionality of poverty and social exclusion. In Micklewright, J. and Jenkins, S. (Eds.), *Poverty and Inequality: New Directions*. Oxford: Oxford University Press.

Nolan, B. and Whelan, C.T. (2007). *Poverty and Deprivation in Europe*. Oxford: Oxford University Press.

Ringen, S. (1988). Direct and indirect measures of poverty. *Journal of Social Policy*, 17, 351–366.

Snijders, T. A. and Bosker, R (1999), *Multilevel Analysis: An introduction to basic and advanced multi-level modelling*, Thousand Oaks CA: Sage

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

Wagstaff, A. and van Doorslaer (2000), 'Income Inequality and Health: What Does the Literature Tell Us?', *Annual Review of Public Health, 21, 543-67*

Whelan, C. T., Layte, R., Maître, B., & Nolan, B. (2001). Income, deprivation and economic strain: An analysis of the European Community Household Panel. *European Sociological Review*, 17, 357–372.

Whelan, C. T. and Maître, B. (2007), 'Measuring Material Deprivation with EU-SIC: Lessons from the Irish Survey', *European Societies*, 9:147-73

Whelan, C. T. and Maître, B. (2009). Europeanization of inequality & European reference group. *Journal of European Social Policy*, 19, 117–130.

Wilkinson, R. and Pickett, K. (2009a). 'Income Inequality and Social Function', *The Annual Review of Sociology*, 33: 493-511

Wilkinson, R. and Pickett, K. (2009b), *The Spirit Level*, London: Routledge.

[i] See Besharov and Couc (forthcoming) Boarani and D'Ercole (2006), Gui, Fusco and Marlier (2009), Nolan and Whelan (2011), Tsaklogou and Paapadopoulous (2001,2002)

[ii] Further details relating to the deprivation items are available from the author.

[iii] See Layte et al (2001), Whelan et al (2004), Guio et al

[iv] The seventh factor has an eigenvalue of 1.010 and produces a modest increase in the total variance explaines to 57.7

[v] Alpha=Np=/[1 + p(N-1)] where N is equal to the number of items and is p is equal to the mean inter-item correlation.

[vi] Because of the sample size all correlations are statistically significant

[vii] Further details are available from the authors

[viii] This measure was adjusted for unemployment policies and proportion of the population over sixty-five,

[ix] The source for the macroeconomic variables is Eurostat with the exception of the MMDI below the mean which are the authors own calculations

[x] The measure of social class employed as a version of the European Socio-economic classification (ESeC) which takes advantage of the availability of information relating to the presence of employees for both farmers and other self-employed