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## 5 Development and validation of a material deprivation index

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- ▶ We develop and validate an index of material deprivation among the European 50+ population
  - ▶ The index is strongly associated with difficulties in making ends meet and the amount of money needed to easily make ends meet
  - ▶ Material deprivation is negatively associated with age and education, and correlates positively with poor health and living in rural areas
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### 5.1 Material deprivation and social exclusion among the older Europeans

Public policy in the European Union has for a long time given high priority to policies aiming at reducing poverty and social exclusion. The European Union 2020 targets explicitly set the ambitious goal of reducing the risk of poverty and social exclusion by 20 million people. Designing policies to enhance social inclusion of individuals has been identified as crucial from the point of view of promoting their well-being and development of comprehensive measures of material deprivation should lay the foundation for further research in this area for the design of effective policies at the national and European level. Indeed, the long-standing notion that unidimensional indicators based on current income could reliably reflect material conditions of households has in the recent decades received a lot of criticism (Atkinson et al. 2002, Jenkins & Cappellari 2007, Bellani & D'Amborsio 2011, Bossert et al. 2013).

We contribute to the discussion on material deprivation by extending the index of deprivation developed in chapter 4 in this volume. In this chapter we use the new information collected in the fifth wave of the SHARE survey and extend the number of items included in our deprivation measure relative to the indices presented in chapter 4. Moreover, we develop an index of material deprivation which can be used for all countries in SHARE Wave 5. Examples of the use of this index are presented in chapters 7, 11, 18, 19, 28 and 30 in this volume.

We detect substantial cross-country variation in deprivation, with Scandinavian countries being the least materially deprived, and countries like Italy and

Estonia with highest levels of material deprivation. We find that the distribution of material deprivation is strongly aligned with other measures of material conditions, in particular those that relate to a broad subjective assessment of these conditions. Most of the variance in deprivation is across countries rather than age groups within countries. Finally, a simple multivariate regression of deprivation on key socio-economic and demographic variables shows that material deprivation is negatively associated with age and education, and positively correlated with living in a rural area and with poor health.

The chapter is structured as follows. Our index is described in section 5.2 and we compare it to other measures of material conditions in section 5.3. Descriptive evidence about the correlates of material deprivation is presented in section 5.4. Conclusions follow.

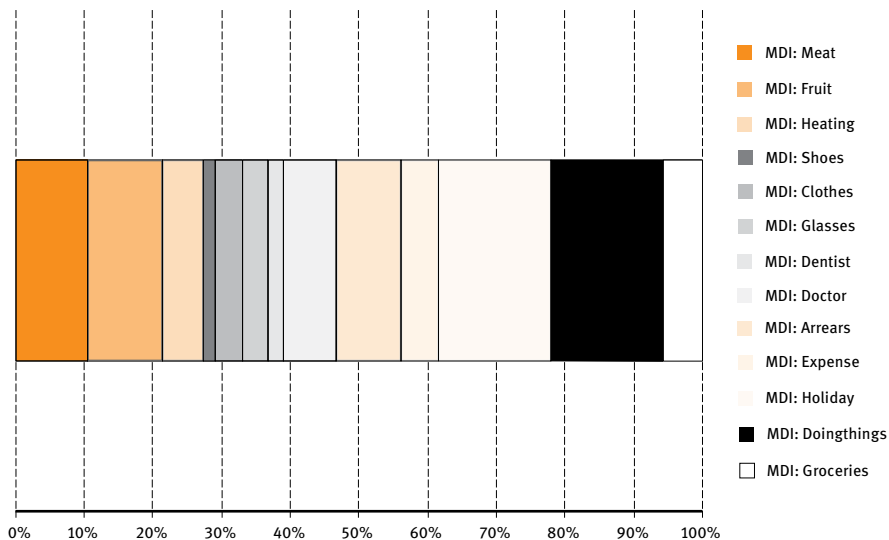
## 5.2 A comprehensive measure of material deprivation

As in chapter 4 in this volume, we assess material deprivation on the basis of a set of 13 items which refer to two broad domains of material well-being: failure in the affordability of basic needs and experience of financial difficulties. The items used in the development of the material deprivation index combine some information regularly collected in SHARE with additional items that were especially introduced into the survey in Wave 5.

As for basic needs domain, we look at the affordability of a minimal quantity of meat, fish, chicken, fruits and vegetables in respondents' diet (if they can afford to eat these at least three times a week), at the affordability of heating costs to avoid feeling cold at home, the replacement of worn out clothes and shoes, the purchase of new needed glasses, visits to the dentist and visits to the doctor (these items are described in chapter 2 in this volume and we label them accordingly: MDI: meat, MDI: fruit, MDI: heating, MDI: clothing, MDI: shoes, MDI: glasses, MDI: dentist, MDI: doctor). Within the financial difficulties domain we use the following items: being in arrears with the payment of rents, the repayment of mortgages or loans on dwelling or having overdue bills; being unable to afford a week long holiday away from home once a year; being unable to pay an unexpected expense without borrowing any money (MDI: arrears, MDI: holidays, MDI: expense; for details see chapter 2 in this volume). In relation to the index developed in chapter 4, we extend our measure of deprivation to include two further items that were asked in the SHARE questionnaire but not in Eurobarometer, and were thus excluded from the analysis in the previous chapter. In

particular, we take into account information on whether lack of money prevents people from doing what they would like to do (included in the “basic necessities” domain) and whether they can afford to shop for groceries regularly (pertaining the “financial difficulties” domain). These two items are labelled as “MDI: doingthings” and “MDI: groceries” respectively. If households report inability to afford any of the items or failure to attain them, they are classified as “deprived” with respect to that item.

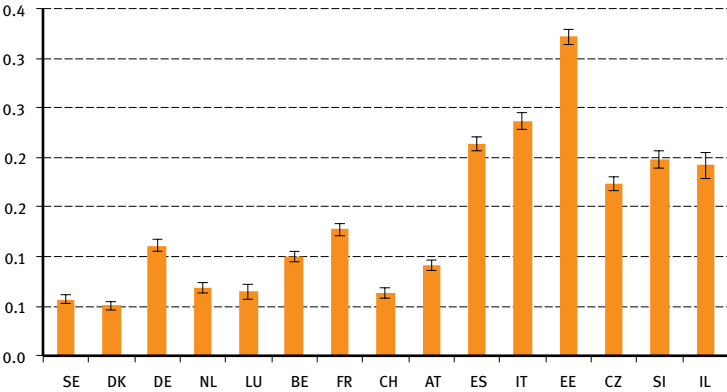
For the index developed in this chapter we aggregate the selected items in a single index of material deprivation on the basis of a hedonic weighting scheme. This means that the index assigns relative relevance of specific items with reference to its association with self-reported life satisfaction (see e.g. Haisken-DeNew & Sinning 2010 and Cavapozzi et al. forthcoming). We estimate hedonic weights by running an ordered probit regression of self-reported life satisfaction on all the items considered and country dummies. The weight attached to each item is given by the related coefficient, after rescaling in such a way that they sum up to 1. To avoid problems related to the aggregation of life satisfaction within households, we consider all observations for whom life satisfaction is reported in each household (standard errors in this estimation are clustered at the household level).



**Figure 5.1:** Weights assigned to MDIs in the material deprivation index

Source: SHARE Wave 5 release 0

The average values of material deprivation by country are presented in Figure 5.2. The relative ordering of countries according to their material deprivation score is in line with what we show in chapter 4: Scandinavian countries have the lowest levels of material deprivation, while countries such as Italy and Estonia have the highest average values of the derived index.



**Figure 5.2:** Deprivation score by country – hedonic weights  
Notes: n = 39,283. Calibrated cross-sectional household weights used  
Source: SHARE Wave 5 release 0

### 5.3 Material deprivation and other measures of material conditions

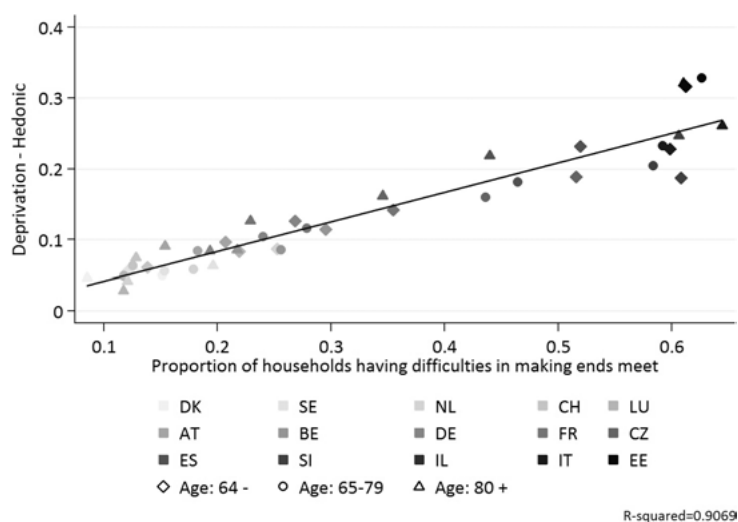
In this section we use a number of alternative measures of material conditions collected in SHARE to assess the validity of the derived index of material deprivation.

In Figure 5.3 we report the association between our material deprivation score and the proportion of households reporting difficulties in making ends meet. The information is given separately by country and age group (<65, 65-79, 80+), and we label countries by colour and age groups by the shape of the marker. The figure shows a strong relationship between the material deprivation score and the proportion of households with difficulties in making ends meet. The R-squared of the unconditional linear regression plotted in Figure 5.3 is close to 0.9, with most of the variation across countries rather than within countries (across age groups).

In Figure 5.4 we consider the association between deprivation and another measure of subjective assessment of material conditions, this time expressed as

the minimum amount of money needed to easily make ends meet. This information is asked of households who declare that they do not make ends meet easily. Figure 5.4 shows the relationship of deprivation with the ratio between the minimum amount of money needed to make ends meet declared by the households and their actual household monthly income (income deficit ratio). By construction, this ratio should be greater than 1. For example, if the ratio is equal to 1.2 this means that the household would need 20 per cent more income to easily make ends meet. As the figure shows, once again there is a strong relationship between the two measures – the more deprived is the household, the higher is the additional amount of income needed to easily make ends meet. The unconditional correlation is very high in this case as well, as the R-squared for the country/age group correlation is about 0.8.

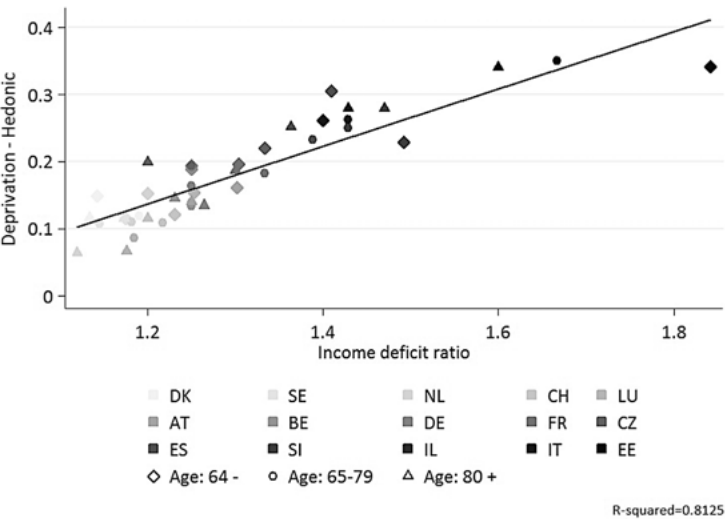
Finally, in Figure 5.5 we show the relationship of deprivation with median household equivalent income (expressed in PPP adjusted euros), once again split by country and age group. Higher incomes are associated with lower levels of deprivation, but in this case the association is much weaker, with the R-squared lower than 0.5. While this confirms an important role of current income in determining material deprivation levels, the comparison with two other indicators in Figures 5.3 and 5.4 suggests that current income is unable to capture significant degree of variation picked up by the broader, subjective measures of material conditions.



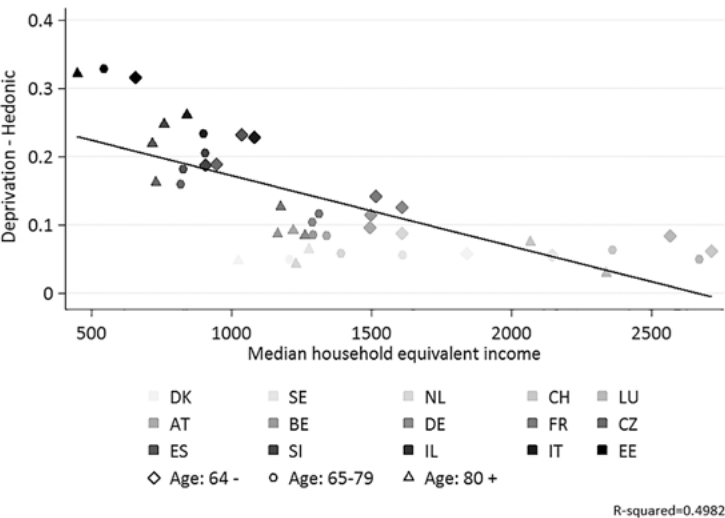
**Figure 5.3:** Deprivation and difficulty making ends meet

Notes:  $n = 36,975$ . Calibrated cross-sectional household weights used

Source: SHARE Wave 5 release 0



**Figure 5.4:** Deprivation and the amount of money needed to easily make ends meet  
Notes:  $n = 23,282$ . Calibrated cross-sectional household weights used; the sample considered includes only households declaring to make ends meet with great difficulties, difficulties or fairly easily  
Source: SHARE Wave 5 release 0



**Figure 5.5:** Deprivation and equivalent household income  
Notes:  $n = 36,975$ . Calibrated cross-sectional household weights used  
Source: SHARE Wave 5 release 0

## 5.4 Determinants of deprivation

To shed more light on our material deprivation measure we run a multivariate regression of the material deprivation index on a relevant set of covariates. Since the material deprivation indicator is computed at the household level, our dataset includes one observation per household. For each household we select the respondent who answered to the questions on the economic condition of the whole household. Individual characteristics considered by the covariates refer to the selected person in the household.

Among the regressors we include a quadratic function of age, household size, a dummy variable for gender, being single, an interaction term between gender and being single, education level (secondary, post-secondary), employment and health status (in the latter case using subjective poor health and the number of chronic health conditions). We also control for ownership status of the dwelling (being homeowner), the number of rooms per capita in the household and living in a rural area. Once observations with missing values in any of the variables included in the estimation are dropped, the resulting sample includes 33,238 households. Results are reported in Table 5.1. We see that material deprivation decreases with age and is lower among couples. Single females are more likely to suffer material deprivation compared to single men. Apart from the difference between single and couple households, material deprivation does not vary with the household size. Education reduces the likelihood of being materially deprived as does employment status and being retired, while poor health significantly contributes to poor material conditions. Households living in rural areas and those with low levels of capital (proxied by property ownership and household size) have higher levels of material deprivation.

**Table 5.1:** The correlates of deprivation

	(1) Coefficient	(2) Standard error
Age	-0.008 ***	(0.001)
Age squared	0.000 ***	(0.000)
Household size	0.001	(0.001)
Female	-0.010 ***	(0.002)
Single	0.032 ***	(0.003)
Female and single	0.027 ***	(0.004)
Secondary education degree	-0.042 ***	(0.002)
Tertiary education degree	-0.061 ***	(0.003)
Retired	-0.061 ***	(0.003)
Employed	-0.107 ***	(0.003)

Table 5.1 (continued)

	(1) Coefficient	(2) Standard error
The household owns the house they occupy	−0.052 ***	(0.002)
Rooms per capita	−0.011 ***	(0.001)
Poor health	0.077 ***	(0.003)
N. of chronic conditions	0.016 ***	(0.001)
Household lives in a rural area	0.005 **	(0.002)
Constant	0.590 ***	(0.043)
Country dummies	YES	
Observations	33,238	
R-squared	0.315	

Significance: \*\*\* = 1 %; \*\* = 5 %; \* = 10 %

Source: SHARE Wave 5 release 0

## 5.5 Measuring and outlining the material deprivation of the older Europeans

In this chapter we develop and validate a comprehensive measure of material deprivation for the European 50+ populations using information collected in SHARE Wave 5.

Our index weights 13 items accounting for material conditions of households, attaining to the broad domains of financial difficulties and failures to reach basic needs. The index provides a comprehensive view on deprivation going beyond information on consumption and income levels. Our measure of material deprivation varies substantially across countries, with the lowest level of material deprivation in Scandinavian countries and the highest in Estonia and Italy. It correlates very strongly with two broad measures of material conditions – the simple assessment of the ability to make ends meet and a ratio of desired to actual household income. The association of the material deprivation index with current income is negative but the correlation is much lower as compared with the previous two measures, in our view confirming the disadvantage of relying only on current income information for analysis of material circumstances. Finally, we have assessed the association between material deprivation and other covariates at the household level and we have shown that deprivation is negatively associated with age and education and positively with being single, living in a rural area and poor health. Although these associations cannot be interpreted as causal effects,



they are still informative about some salient predictors of deprivation and indicate a strong relationship between a number of areas relevant from the point of view of policy. Detailed mechanisms determining the variation in material deprivation deserve further investigation, but we believe the measure developed in this chapter can serve as an important tool to monitor developments in material well-being of older people and to guide policy decisions to improve it.

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