



# **How do European citizens cope with economic shock?**

**Expenditures that households in hardship are curtailing first**

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# HOW DO EUROPEAN CITIZENS COPE WITH ECONOMIC SHOCK?

## EXPENDITURES THAT HOUSEHOLDS IN HARDSHIP ARE CURTAILING FIRST

Anne-Catherine Guio<sup>1</sup> and Marco Pomati<sup>2</sup>

### Summary and main findings

Despite the remarkable resilience of many households to face with lack of resources, it is widely documented that the reduction or adjustment of household consumption is one of the most common coping strategies envisaged by households experiencing an economic shock<sup>3</sup>. However, no research has used quantitative analysis to formally establish the order in which deprivations are experienced as resources drop, whether there is a common curtailment order across the EU and if this differs across households. The aim of this paper is to understand which items people have to go without as their resources decrease and they start to experience moderate and possibly extreme deprivation.

Based on the limited information available from the core part of EU Statistics on Income and Living Conditions (EU-SILC) data-set, the “standard” EU MD rate is currently defined as the proportion of people living in households who cannot afford at least three of the following nine items (see Annex 1):

- 1) coping with unexpected expenses;
- 2) one week’s annual holiday away from home;
- 3) avoiding arrears (in mortgage or rent, utility bills or hire purchase instalments);
- 4) a meal with meat, chicken, fish or vegetarian equivalent every second day;
- 5) keeping the home adequately warm;
- 6) a washing machine;
- 7) a colour TV;
- 8) a telephone;
- 9) a personal car.

Since June 2010, when EU leaders launched the new “Europe 2020 Strategy” and set in this context an EU social inclusion target, the importance of EU MD indicators has grown

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<sup>3</sup> For a review of the evidence see Pemberton, S., Sutton, E. and Fahmy, E. (2013) *A review of the qualitative evidence relating to the experience of poverty and exclusion*. Bristol, UK: Poverty and Social Exclusion in the UK (Working Paper - Methods Series No.22), pp. 1–59. Also see:

Yeung, W. J. and Hofferth, S. L. (1998) ‘Family adaptations to income and job loss in the US’, *Journal of Family and Economic Issues*, 19(3), pp. 255–283

Kempson, E. (1996) *Life on a Low Income*. York: Joseph Rowntree Foundation

Saunders, P., Sutherland, K. Davidson, P., Hampshire, A. King, S. and Taylor, J. (2006) *Experiencing Poverty: The Voices of Low-Income Australians. Towards New Indicators of disadvantage Project. Stage:1 Focus Group Outcomes*. Sydney: SPRC

considerably. Indeed, this target, which consists of lifting at least 20 million people out of the risk of poverty or social exclusion in the EU by 2020, is based on three indicators. One of them is a measure of “severe” deprivation, which is built in the same way as the “standard” measure but with a threshold set at four rather than three enforced lacks.

The first part of the report presents evidence of recent trends (2005-2012) in material deprivation, using both cross-sectional and longitudinal EU-SILC.

This first section (section 1.1) shows the differentiated impact of the crisis across Member-States. Different clusters of countries are highlighted:

- in ES, IT, IE, MT and UK, living standards decreased dramatically as a result of the crisis (2008-2012), after a flat trend before the crisis (2005-2008);
- in LT, LV, EE, CY, EL and to a lesser extent in BG, deprivation first improved before the crisis and then increased dramatically after the crisis;
- on the contrary, in PL, SK, CZ and to a lesser extent RO, deprivation improved during the whole period;
- in the rest of the countries, the trend was relatively flat.

The seven countries explored in the qualitative surveys of the project “Coping Strategies during the Crisis” belongs to each of these four clusters (FR, DE, IE, PT, ES, EL and RO).

This evidence is complemented by a similar analysis performed at the MD item level in the second section (section 1.2). This shows that some items seem to capture the impact of the crisis more than others. The enforced lack of holidays, the inability to face unexpected expenses, the enforced lack of meat/chicken/fish/vegetarian equivalent each second day, the lack of money to keep the home adequately warm or to avoid arrears are items for which the largest variations are visible. This suggests that households experiencing a drop in resources curtail some items first. This point is further explored in the second part of the report.

In the third section (section 1.3), the longitudinal element of the EU-SILC is used to look at how life events associated with the current economic recession impact on people’s living conditions. During the crisis, a substantial proportion of the population lost their job or at least lived in a household where at least one adult experienced this event. This proportion exceeds 15% in IT, CY, LT and is even larger than 20% in PT, EE (25%), BG (28%), or greater than 30% in ES (30%) and LV (38%). Our regression analysis shows that the loss of employment is significantly linked to greater chances of becoming poor or deprived. Other job related factors, such as change to part-time hours or fall in inactivity are also associated with income loss (but not necessarily with the experience of material deprivation). Experiencing bad health or events such as partnership dissolution, child birth, or being single or a single parent increase the risk of falling in income poverty and/or entering into material deprivation. We also look at the consequences of job lost on items deprivation. By comparing the deprivation level of these people before job loss and after, we can identify the items which were most heavily curtailed. Our results show that holidays deprivation and inability to face unexpected expenses are the two items which increased the most, followed by the inability (due to insufficient income) to afford meat/fish/chicken each second day and keep one’s home adequately warm. This evidence tends to show that there is an order of curtailment, which explain why some deprivation items increased the most after these critical events.

The second part of the paper explores the question of a possible order of curtailment and tries to highlight this order in different countries, i.e. the order in which expenditures are curtailed when resources such as income decrease. This first section (section 2.1) profits from the availability (in a thematic module on material deprivation in EU-SILC 2009) of a larger set of robust deprivation items than those used currently in the EU material deprivation indicators (six items are common to both scales). Respondents are asked if they cannot afford:

- 1) to replace worn-out clothes by some new (not second-hand) ones;
- 2) to afford two pairs of properly fitting shoes, including a pair of all-weather shoes;
- 3) to spend a small amount of money each week on oneself without having to consult anyone (hereafter referred to as “pocket money”);
- 4) to get together with friends/family for a drink/meal at least monthly;
- 5) to have regular leisure activities;
- 6) to replace worn-out furniture (but would like to have);
- 7) to afford a meal with meat, chicken, fish or vegetarian equivalent every second day;
- 8) to face unexpected expenses;
- 9) to keep home adequately warm;
- 10) to afford one week annual holiday away from home;
- 11) to avoid arrears (mortgage or rent, utility bills or hire purchase instalments)
- 12) to afford/ have access to a car/van for private use (but would like to have)
- 13) to afford a computer and an internet connection (but would like to have)

Using the Deprivation Sequence methodology developed by Deutsch and Silber (2008), the most common deprivation order is highlighted at the EU level and in each country. This analysis shows that overall, households tend on average to first cut back on their annual holidays and use up their savings (resulting in inability to face unexpected expenses), they are then unable to afford new furniture, pocket money, leisure and social activities and as their resources decrease even further they are unable to afford meals, a warm house and paying the bills and eventually even two pairs of all-weather shoes. Our results also show a large degree of overlap between the deprivation sequences of different countries across the EU. Hence, despite the large diversity in deprivation levels within the EU, these results tend to show a very similar deprivation order in most countries, which is a remarkable result.

As this deprivation order was obtained by comparing the deprivation patterns of people with different deprivation levels at one point in time (as these 13 items are only available in the cross-sectional component of EU-SILC), in order to validate these results, it is crucial to follow individuals as they become more or less deprived across time, i.e. by using panel data. The second therefore section (section 2.2) uses the longitudinal component of the EU-SILC to test whether the order obtained on cross-sectional data reflects the order of curtailment of the same individuals across time. This exercise has however a cost in terms of data availability, as only six items (out of the initial list of 13 items used in section 2.1) are available in the longitudinal element of EU-SILC.. The results are very clear: the best EU deprivation order of curtailment for both cross-sectional (2009) and longitudinal data (2009-2011, obtained by analysing the same individuals during three consecutive waves) show either a perfect or very close match in all countries. This suggests that the 13-item order shown above can be considered a good predictor of the longitudinal deprivation sequence. Our analysis also shows that questions on extreme deprivations such as two pairs of shoes are however needed in the longitudinal element of the EU-SILC to further corroborate the cross-sectional results and give a richer overview of the severity of deprivation.

## Introduction

Despite the remarkable resilience of many households to face with lack of resources, it is widely documented that the reduction or adjustment of household consumption is one of the most common coping strategies envisaged by households experiencing an economic shock<sup>4</sup>. However, no research has used quantitative analysis to formally establish the order in which deprivations are experienced as resources drop, whether there is a common curtailment order across the EU and if this differs across households. The aim of this paper is to understand which items people have to go without as their resources decrease and they start to experience moderate and possibly extreme deprivation.

Based on the limited information available from the core part of EU Statistics on Income and Living Conditions (EU-SILC) data-set, the “standard” EU MD rate is currently defined as the proportion of people living in households who cannot afford at least three of the following nine items (see Annex 1):

- 1) coping with unexpected expenses;
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Since June 2010, when EU leaders launched the new “Europe 2020 Strategy” and set in this context an EU social inclusion target, the importance of EU MD indicators has grown considerably. Indeed, this target, which consists of lifting at least 20 million people out of the risk of poverty or social exclusion in the EU by 2020, is based on three indicators. One of them is a measure of “severe” deprivation, which is built in the same way as the “standard” measure but with a threshold set at four rather than three enforced lacks.

The first part of the report presents evidences of the recent trends (2005-2012) in material deprivation, using both cross-section and longitudinal EU-SILC. This evidence is then complemented by a similar analysis performed at the MD item level in the second section

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<sup>4</sup> For a review of the evidence see Pemberton, S., Sutton, E. and Fahmy, E. (2013) *A review of the qualitative evidence relating to the experience of poverty and exclusion*. Bristol, UK: Poverty and Social Exclusion in the UK (Working Paper - Methods Series No.22), pp. 1–59. Also see:

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(section 1.2), in order to test whether some items capture more the impact of the crisis than others. In the third section (section 1.3), the longitudinal element of the EU-SILC is also used to look at how life events associated with the current economic recession, such as job lost, impact on people living conditions.

The second part of the paper explores the question of a possible order of curtailment and tries to highlight this order in different countries, i.e. the order in which expenditures are curtailed when resources such as income decrease. This first section (section 2.1) profits from the availability (in a thematic module on material deprivation in EU-SILC 2009) of a larger set of robust deprivation items, than those used currently in the EU material deprivation indicators (six items are common to both scales). These 13 items capture situation in which people cannot afford:

- 1) to replace worn-out clothes by some new (not second-hand) ones;
- 2) to afford two pairs of properly fitting shoes, including a pair of all-weather shoes;
- 3) to spend a small amount of money each week on oneself without having to consult anyone (hereafter referred to as “pocket money”);
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- 13) to afford a computer and an internet connection (but would like to have)

Using the Deprivation Sequence methodology developed by Deutsch and Silber (2008)<sup>5</sup>, the most common deprivation order is highlighted at the EU level and in each country.

This deprivation order was obtained by comparing the deprivation patterns of people with different deprivation levels at one point in time (as these 13 items are only available in the cross-sectional component of EU-SILC). To validate these results, it was however crucial to follow individuals as they become more or less deprived across time. The second section (section 2.2) uses therefore the longitudinal component of the EU-SILC to test whether the order obtained on cross-sectional data reflects the order of curtailment of the same individuals across time. This exercise has however a cost in terms of data availability, as only six items (out of the initial list of 13 items used in section 2.1) are available in the longitudinal element of EU-SILC.

Finally, a conclusion presents the main findings of our report.

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<sup>5</sup> Deutsch, J. and J. Silber (2008) ‘The Order of Acquisition of Durable Goods and the Multidimensional Measurement of Poverty’ in Quantitative Approaches to Multidimensional Poverty Measurement, N. Kakwani and J. Silber, editors, Palgrave-Macmillan.

# PART 1: Impact of the crisis: recent trends in material deprivation

## Section 1.1: Evolution of EU MD indicators over time

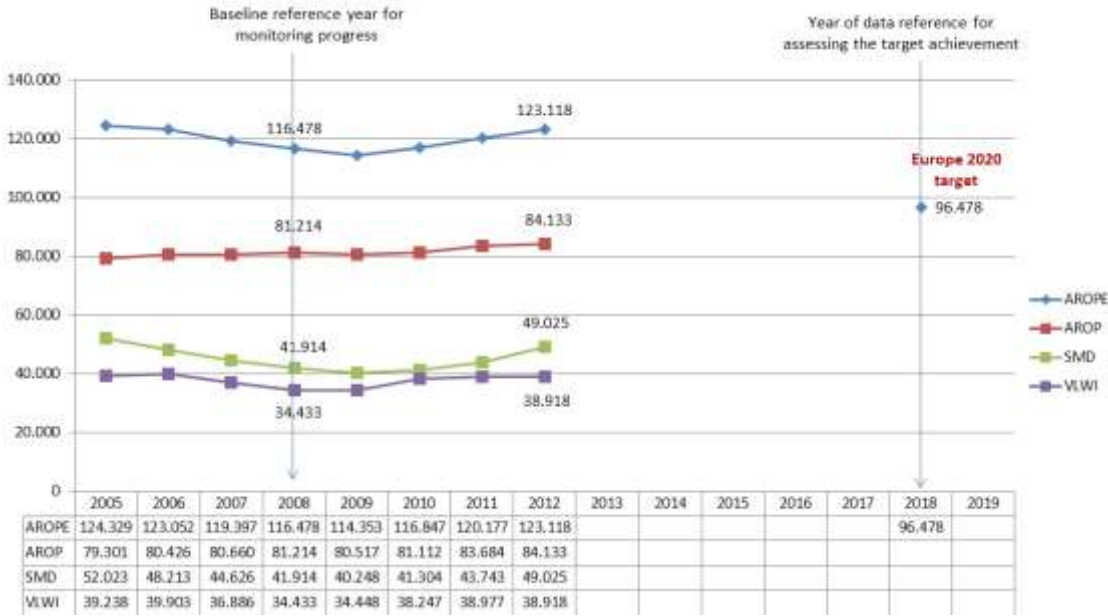
The recent economic crisis had a dramatic impact on European citizens, leading to more people experiencing poverty, material deprivation and labour market exclusion, as shown by trends in the EU social inclusion target and its components (see Figure 1). The total number of people at risk of poverty or social exclusion (AROPE), which encompasses people at-risk-of-poverty (AROP) and/or living in very low work intensity households (VLWI) and/or suffering from severe material deprivation (SMD, see definition in Annex 1) increased by 8.765.000 between 2009 and 2012.

Severe material deprivation decreased between 2005 and 2008 due to general living conditions improvements, mainly in new Member States and then increased from 2009, due to the crisis. As argued by Gordon (2006)<sup>6</sup>, one can expect a lagged relationship between reduction of income (caused by, for example, low work intensity, unemployment, and household composition changes) and material deprivation. As household income falls, household members may still be able to consume certain necessities (for example by using savings, or borrowing money). However, long lasting spells of low incomes might lead households to curtail consumption, resulting in increased levels of material deprivation. The growth in the number of people at risk of poverty starting in 2010 and the large increase in SMD between 2011 and 2012 confirm these expectations.

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<sup>6</sup> Gordon, D. (2006) 'The concept and measurement of poverty', in Pantazis, C., Gordon, D., and Levitas, R. (eds) *Poverty and social exclusion in Britain: The millennium survey*. Bristol: The Policy Press, pp. 29 – 60.

**Figure 1: Evolution of the EU 2020 poverty and social exclusion target (in 1000) and its components**



Source: SPC report (2014)<sup>7</sup>

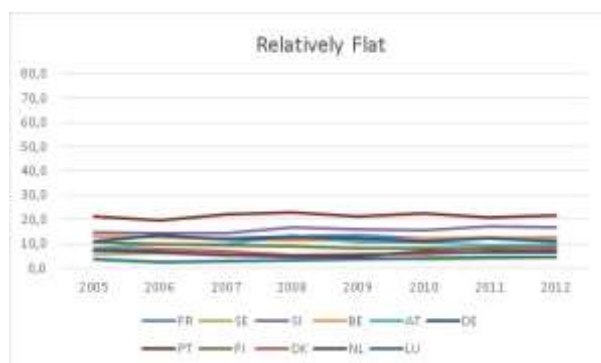
The overall EU evolution hides a large diversity of national trajectories, as illustrated in Figure 2, which presents the 2005-2012 evolution of material deprivation within the EU (see Annex 2 for country abbreviations). The countries are grouped into four clusters, depending on the shape of their deprivation trend<sup>8</sup>. Figure 3 presents both absolute and percentage changes in material deprivation for the pre-crisis (2005-2008) and post-crisis (2008-2012) periods.

<sup>7</sup> For the at-risk-of poverty rate, the income reference year is the calendar year prior to the survey year (i.e. 2011) except for the United Kingdom (survey year) and Ireland (12 months preceding the survey). Similarly, the very low work intensity rate refers to the previous calendar year (i.e. 2011) while for the severe material deprivation rate, the reference is the current year (i.e. 2012).

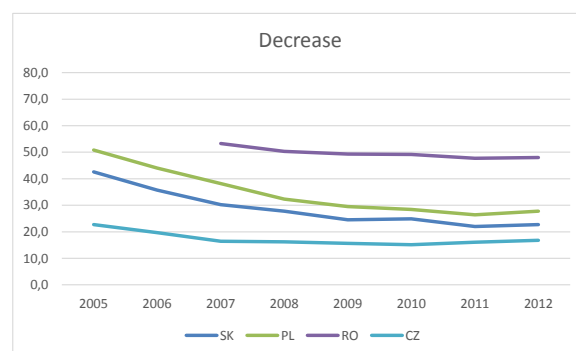
<sup>8</sup> Breaks in series for 2012 in AT and UK and provisional data for BE, so evolutions for these countries need to be interpreted with caution. Currently no 2012 data for IE (2011 data used instead).

**Figure 2: Shares of people suffering from material deprivation, 2005-2012, four groups of countries ranked according their shape of the deprivation trend**

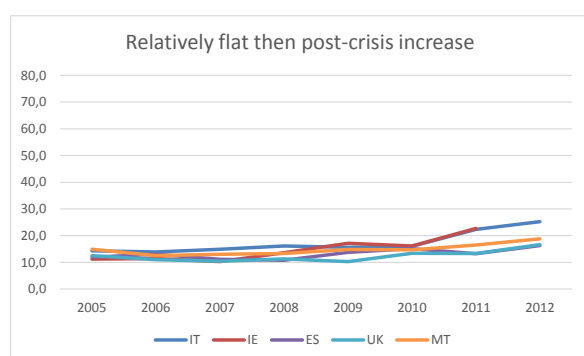
**1**



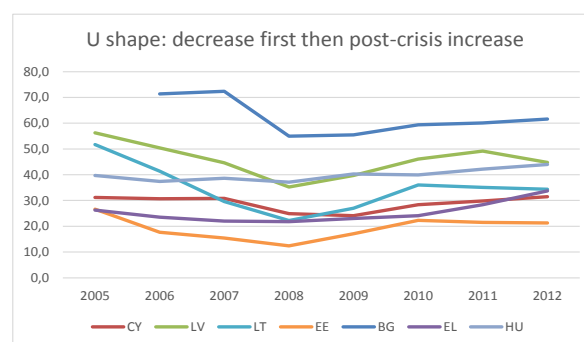
**3**



**2**



**4**



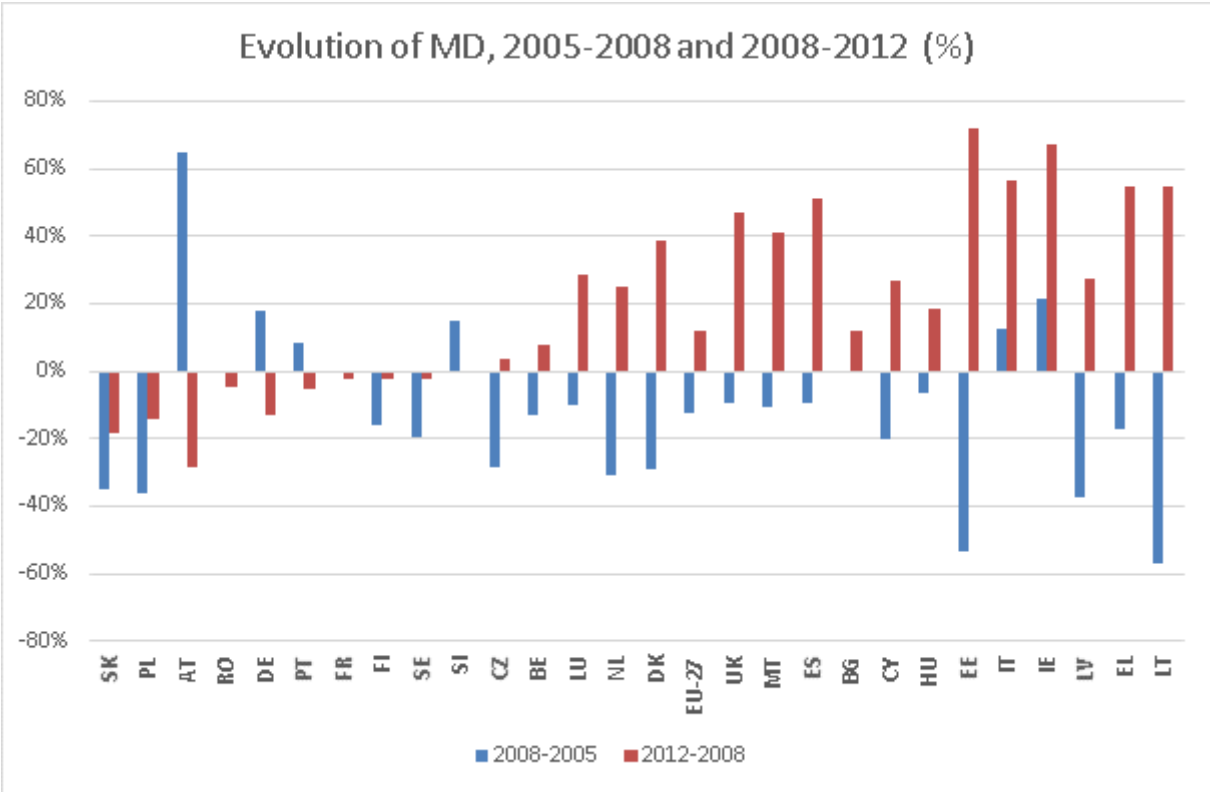
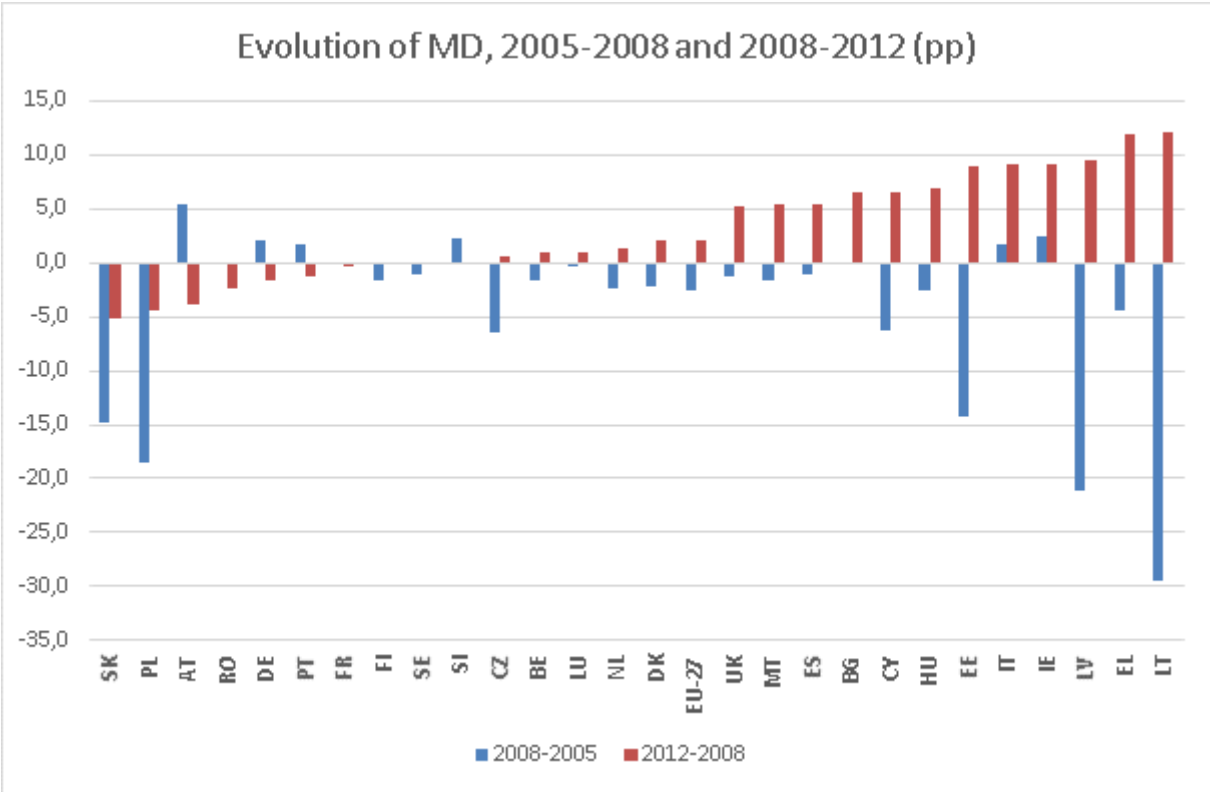
Source: Eurostat (EU-SILC). No data available for BG and RO in 2005 and 2006, and for IE in 2012. Data provisional for BE.

In Figure 2, four clusters of national material deprivation trends are identified:

1. The first cluster includes countries where the general trend was relatively flat. Although there may have been annual changes, no clear increase/decrease could be highlighted for the whole period. Except PT, all these countries have the lowest MD.
2. Countries in the second cluster witnessed a flat deprivation trend in the pre-crisis period, but MD increased sharply after the crisis. These countries are mainly “old” Member states, whose living standards decreased dramatically as a result of the crisis (ES, IT, IE, MT, UK). Their deprivation trends are also visible in Chart 3, and characterised by a small differences in rates between 2005 and 2008 and much greater ones for the following period (blue and red bars respectively).
3. The third cluster shows countries where deprivation improved during the whole period (PL, SK, CZ and to a lesser extent RO), see also left hand side in chart 3.
4. The last cluster includes Eastern/Southern countries where deprivation improved before the crisis and increased dramatically after the crisis (LT, LV, EE, CY, EL and to a lesser extent BG and HU). These are visible on the right hand side of Figure 3; the red and blue bars for these countries point in opposite directions.

The seven countries explored in the qualitative surveys of the project belongs to each of these four clusters (FR, DE and PT in the first cluster; ES and IE in the second one; RO in the third cluster and EL in the fourth group).

**Figure 3: Evolution of Material Deprivation (MD) over time, 2005-2008 and 2008-2012, absolute and percentage changes (countries classified according to the 2008-2012 evolution in pp)**



Source: Eurostat (EU-SILC). No data available for BG and RO in 2005 and 2006, and for IE in 2012. Data provisional for BE.

## Section 1.2 Evolution at the item level

Table 1 presents the evolution of material deprivation for each item during the post-crisis period (2008-2012). Cells highlighted in red depict an increase in the proportion of people not being able to afford the item, cells in blue highlight a decrease of this proportion. Countries are ordered according to the four material deprivation trends described above.

Some items seem to capture the impact of the crisis more than others. The enforced lack of holidays, the inability to face unexpected expenses, the enforced lack of meat/chicken/fish/vegetarian equivalent each second day, the lack of money to keep the home adequately warm or to avoid arrears are items for which the largest variations are visible. The inability to afford durables such as TV, telephone or washing machine is relatively rare, yet in countries where their lack is more widespread (Romania and Bulgaria), deprivation rates have been decreasing. These three items will therefore not be studied in the rest of the report. Guio et al. (2012) showed that these three items are not robust to study material deprivation across the EU countries.

In countries where Material Deprivation increased the most (EL, LV, IE, IT, EE, HU, CY, BG, MT, ES, UK), deterioration in living standards is shown by increases in deprivation of the first five items, especially holidays and unexpected expenses.

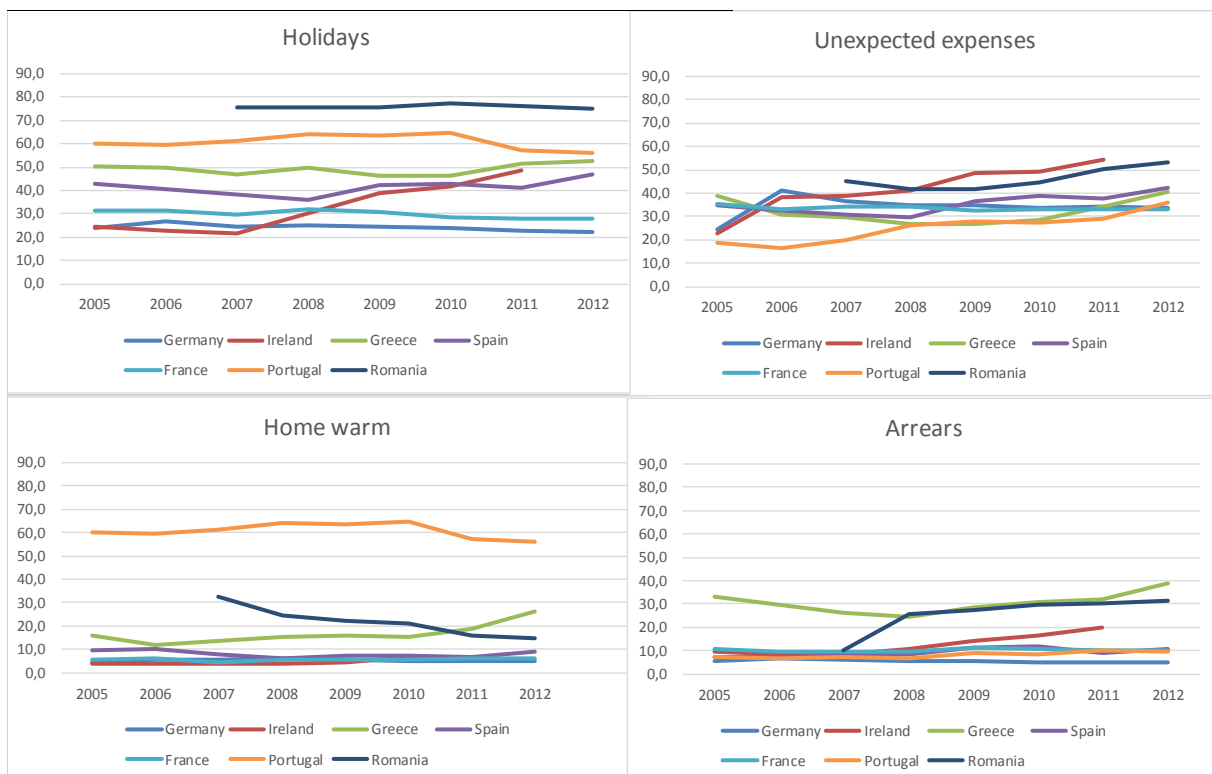
This suggests that households experiencing a drop in resources curtail these two items first. The second part of the report explores this question and tries to highlight the order of curtailment in different countries, i.e. the order in which expenditures are curtailed when resources such as income decrease.

Figure 4 shows these trends for the most sensitive items and focuses on the sub-set of countries covered by the qualitative surveys (FR, DE, IE, RO, EL, ES, PT). Figure 5 presents radar charts which highlight the evolution at the item level, between 2005, 2008 and 2012 in this sub-set of countries which participated to the qualitative survey of the project. These radar charts show that in IE, EL and ES there was a deterioration of MD in the majority of items, due to the crisis. In RO and PT, some items deteriorated (unexpected expenses and arrears), although deprivation of the rest of items decreased. IN DE and FR, no clear trend is visible.

Table 1: Evolution of the proportion of deprivation over time, 2008-2012, absolute changes (countries classified according to MD evolution)

2008-2012	MD	Holidays	Unexpected expenses	Meat/chicken /fish	Home warm	Arrears	Car	Washing machine	TV	Telephone
Slovakia	-5,1	-7	-2,4	-5,9	-0,5	3	-4,8	-0,1	0,2	-0,6
Poland	-4,5	-1,3	3,4	-5,4	-6,9	3,9	-6,6	-0,4	-0,1	-0,8
Austria	-3,9	-6,7	-6,7	-6,2	-1,4	0,1	-1,5	-0,3	0,1	-0,4
Romania	-2,3	-0,5	11,4	4,4	-10	5,7	-9,1	-7,1	-1,0	-6,4
Germany	-1,7	-3,3	-1,5	-2,7	-1,2	-0,8	2,7	0,1	-0,2	0,1
Portugal	-1,2	-8,2	9,7	-1,4	-7,9	3,3	-0,2	-1,1	-0,1	-3,7
France	-0,3	-4,2	-1,1	-0,9	0,7	0,6	-0,4	-0,1	0	-0,6
Finland	-0,2	-2,9	-1,8	0,1	-0,4	0,4	-0,2	-0,6	0,1	-0,1
Sweden	-0,1	-0,7	-1,9	-0,2	-0,1	0,4	0,2	0	0	0
Slovenia	0	-0,8	1,2	-3,1	0,5	4,9	0,4	0,2	0,1	-0,1
Czech Republic	0,6	4,5	4,5	0,3	0,7	1,6	-1,7	-0,1	-0,1	-0,3
Belgium	0,9	1,7	1,5	0,4	0,2	1,7	0,6	0,1	0,2	0
Luxembourg	1,0	2,6	5,2	-0,1	-0,3	1,8	0,9	0,1	0,3	0
Netherlands	1,3	2,8	2,6	0,9	0,4	0,9	0,8	-0,1	-0,1	0
Denmark	2,1	4,4	3,8	0,1	0,9	3,7	0,4	-0,3	0,4	0
European Union	2,1	2,6	5,7	1,5	0,7	0,9	-0,3	-0,6	-0,1	-0,6
United Kingdom	5,3	9,1	14,3	5,0	2,1	-3,4	4	0,1	0,2	0,2
Spain	5,5	10,4	12,2	0,4	3,1	2,7	-0,2	0	0	0,3
Malta	5,5	-11,9	-7,5	2,6	13,1	1,8	-0,1	0,2	0,2	0
Bulgaria	6,6	14,9	11,2	22,3	-19,8	-4,0	-6,0	-6,2	-1,6	-0,3
Cyprus	6,6	3,8	10,4	-1,1	1,5	17,4	-0,1	0	0,1	-0,1
Hungary	6,9	0,4	6,7	5,9	4,8	9,9	2,2	-1,5	-0,3	-0,5
Estonia	8,9	4,1	25	5,4	3,1	4,5	-1,5	-0,8	-0,1	-0,3
Italy	9,1	11	10,9	9,3	9,9	-2,3	-1,2	-0,1	-0,1	-1
Ireland	9,1	18,2	13,4	-0,2	3,1	9,1	-0,4	-0,1	0,1	1,1
Latvia	9,6	7,6	16,7	1,9	3,3	10,9	2,7	-1,2	0,3	-0,4
Greece	11,9	3,0	13,9	7,1	10,7	14,6	1,2	-1	-0,2	-0,1
Lithuania	12,2	20,9	21,6	3,9	12,0	5,1	2,0	-1,9	-0,5	-0,4

**Figure 4: Shares of people suffering from deprivation at the item level, 2005-2012, countries covered by the qualitative surveys (FR, DE, IE, RO, EL, ES, PT)**



Source: Eurostat (EU-SILC). No data available for RO in 2005 and 2006, and for IE in 2012.

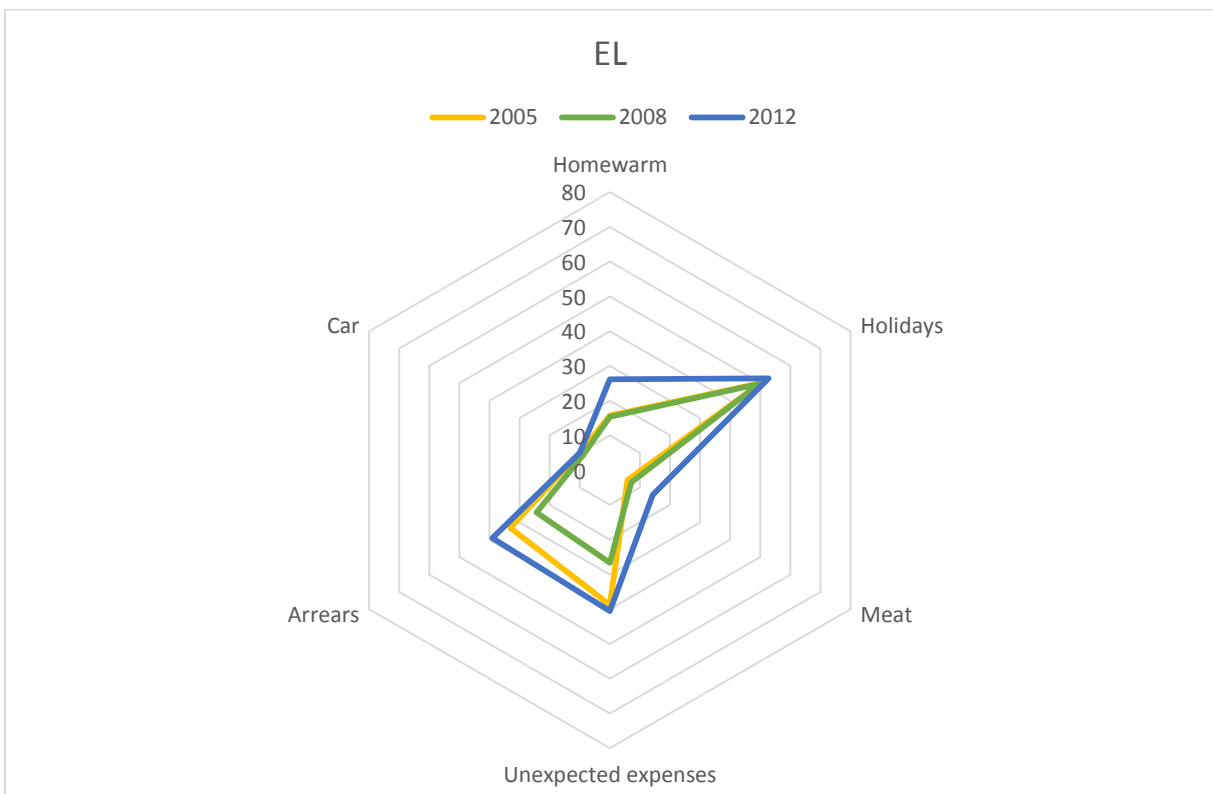
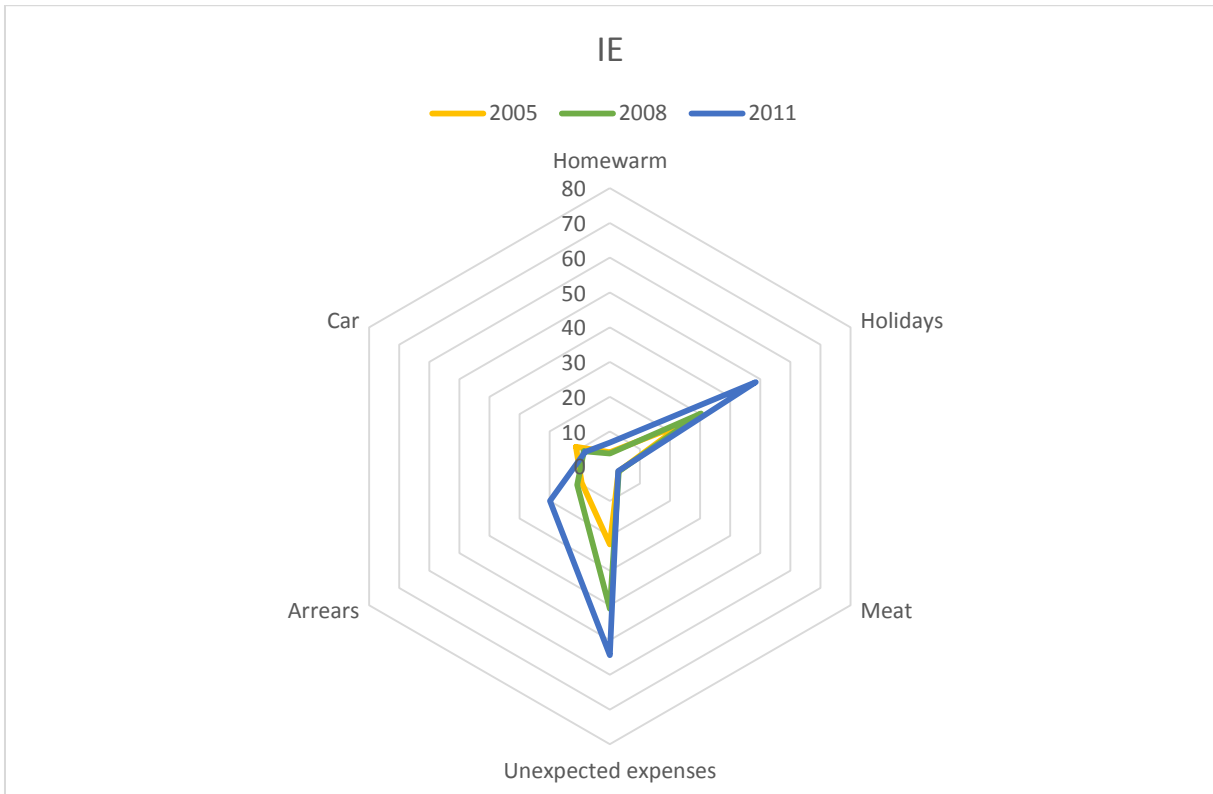


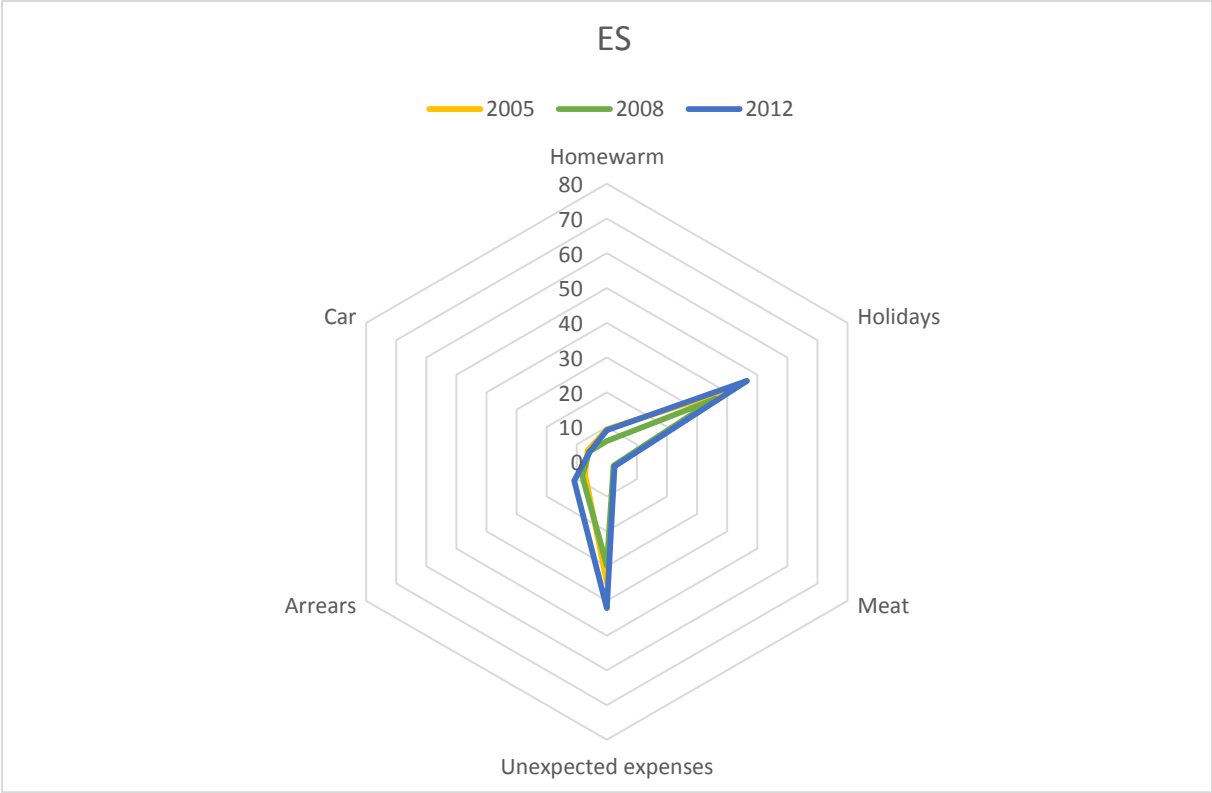
**Figure 5: Evolution of the shares of people suffering from deprivation in each item, 2005-2012, countries covered by the qualitative surveys (FR, DE, IE, RO, EL, ES, PT)**

1. FR and DE: no clear trend

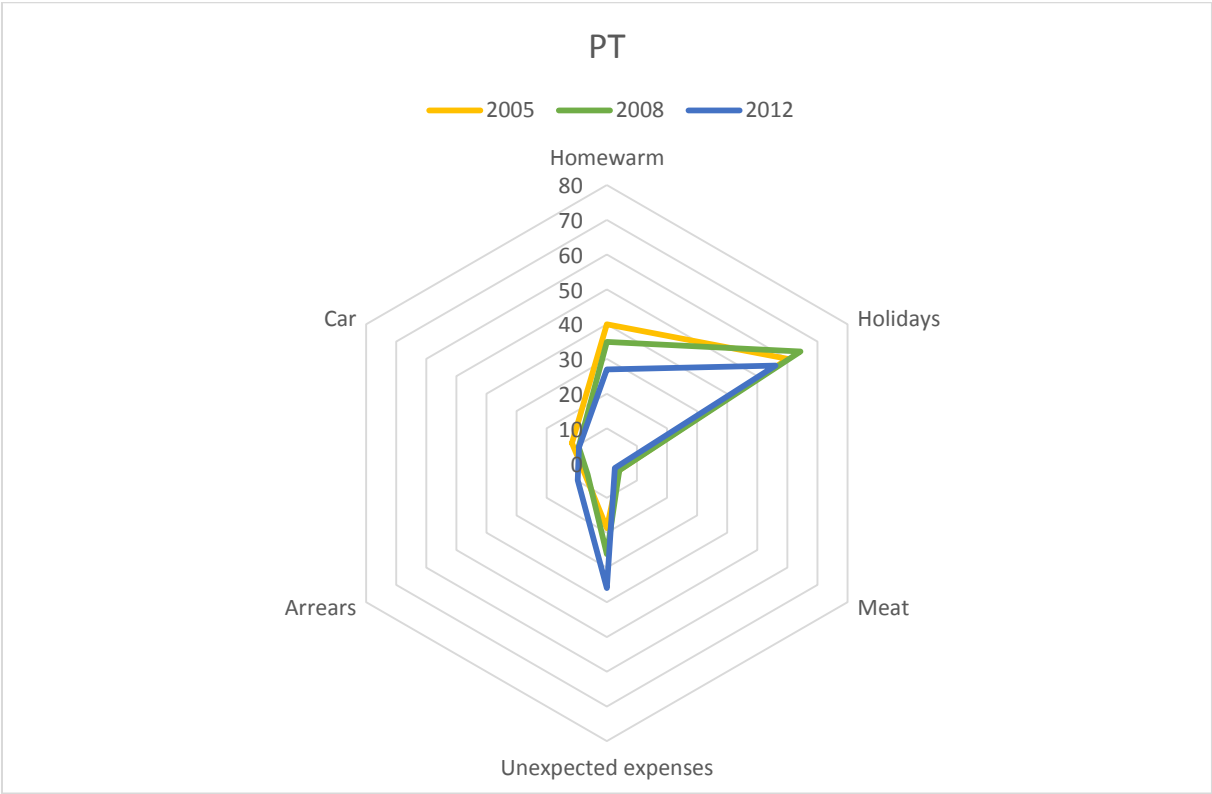


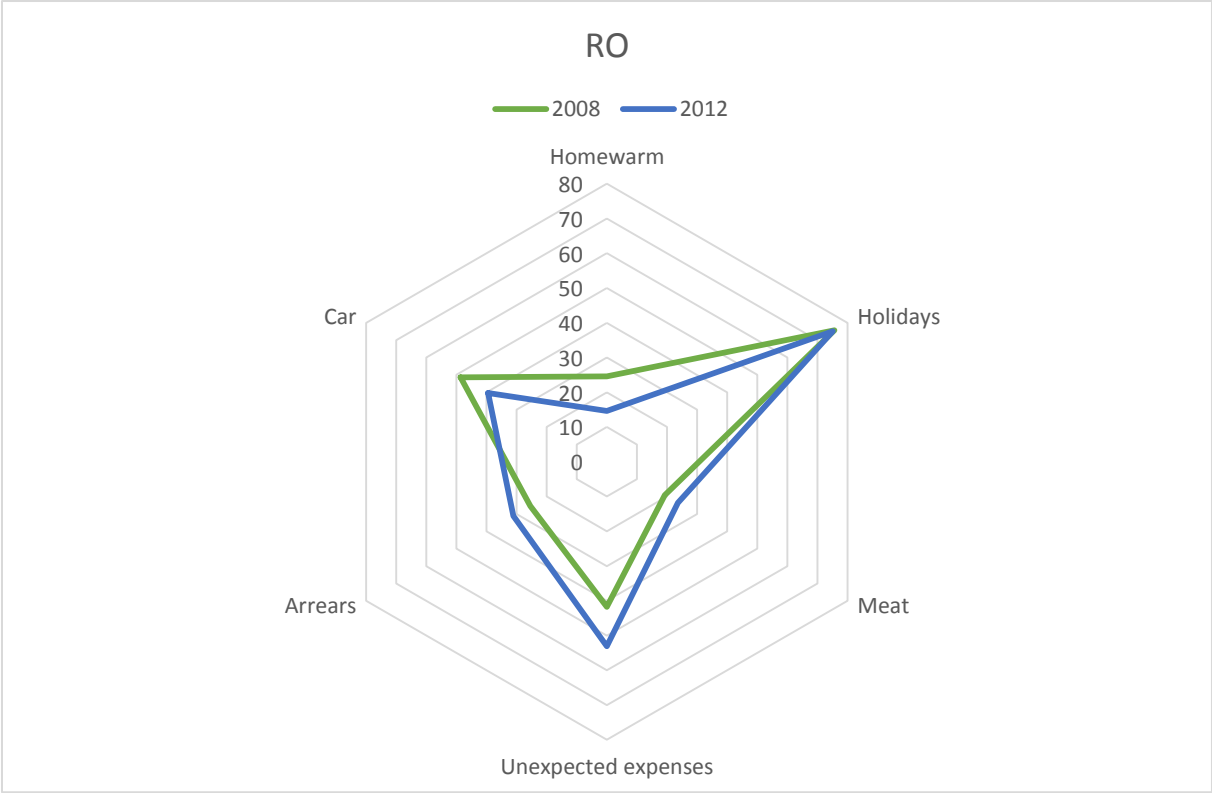
2. IE, ES, EL: significant impact of the crisis on most items





3. PT and RO: mixed picture



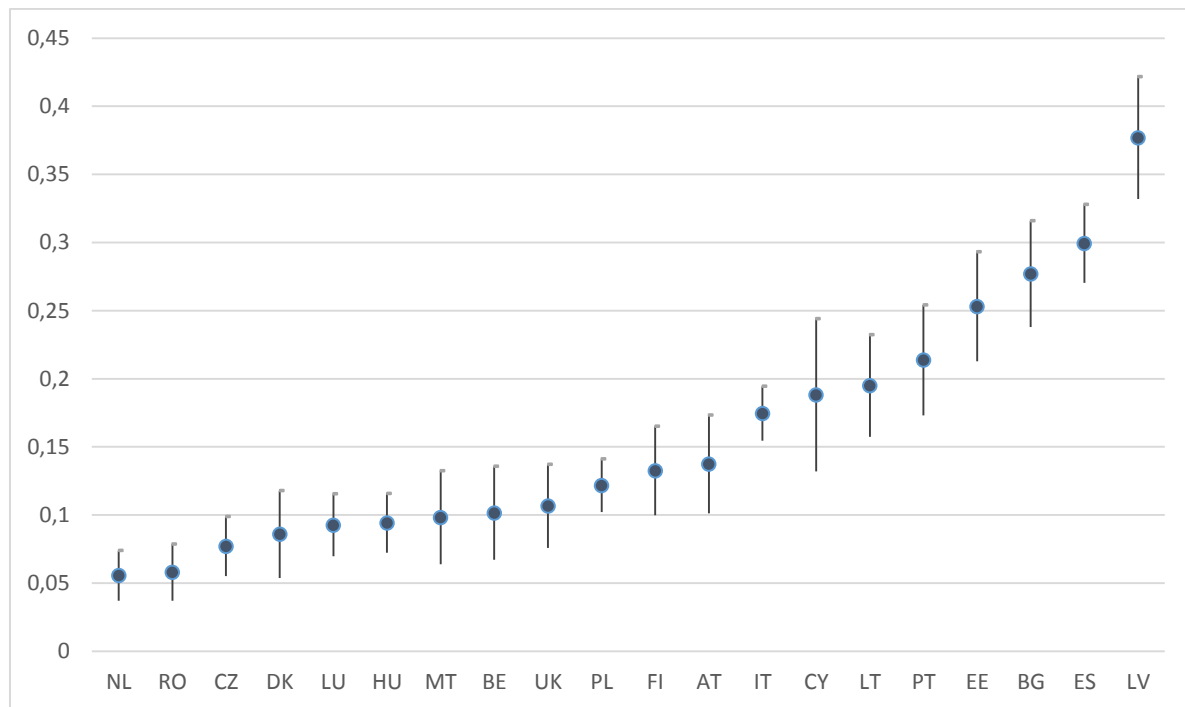


Source: Eurostat (EU-SILC). No data available for RO in 2005 and 2006, and for IE in 2012.

### Section 1.3: A focus on people who lost their job during the 2008-2011 period

The loss of employment is clearly linked to greater chances of becoming poor or deprived. During the crisis, a substantial proportion of the population lost their job or at least lived in a household where at least one adult experienced this event. Figure 6 presents the proportion of adults aged between 18 and 59 years old living in a household where at least one adult experienced the loss of employment. This proportion exceeds 15% in IT, CY, LT and is even larger than 20% in PT, EE (25%), BG (28%), or greater than 30% in ES (30%) and LV (38%).

**Figure 6: Proportion of people (18-59 years) living in a household with at least one job loss during the period 2008-11**



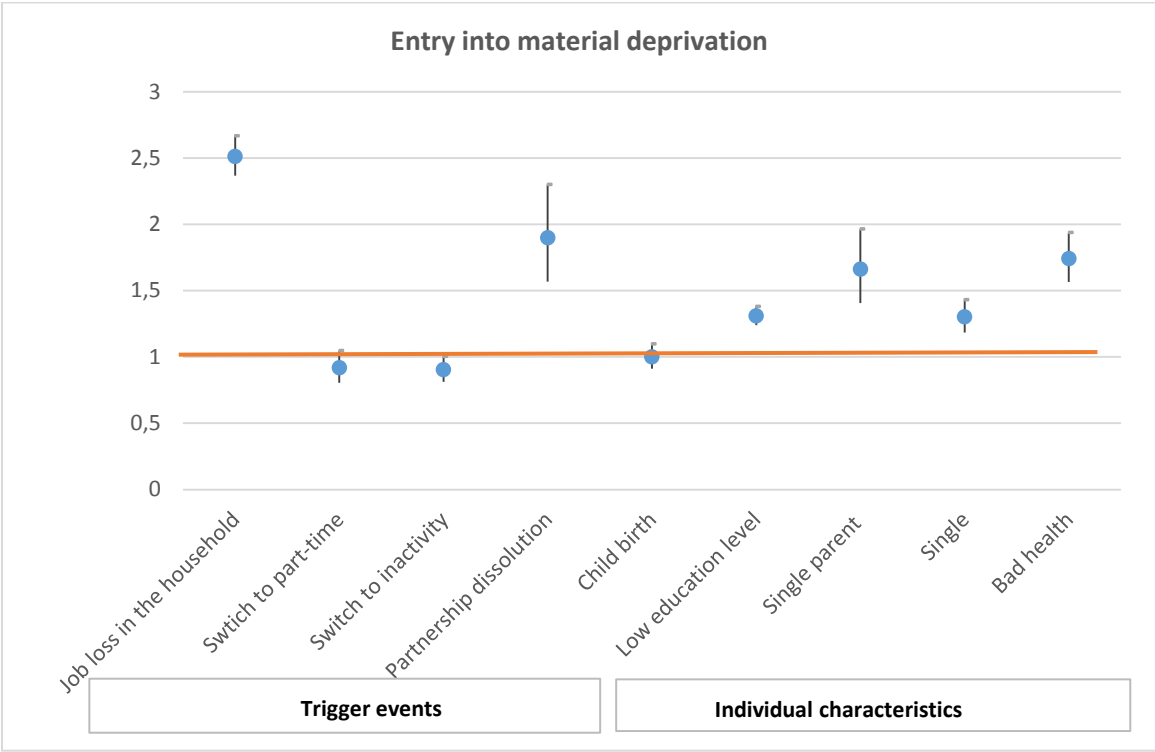
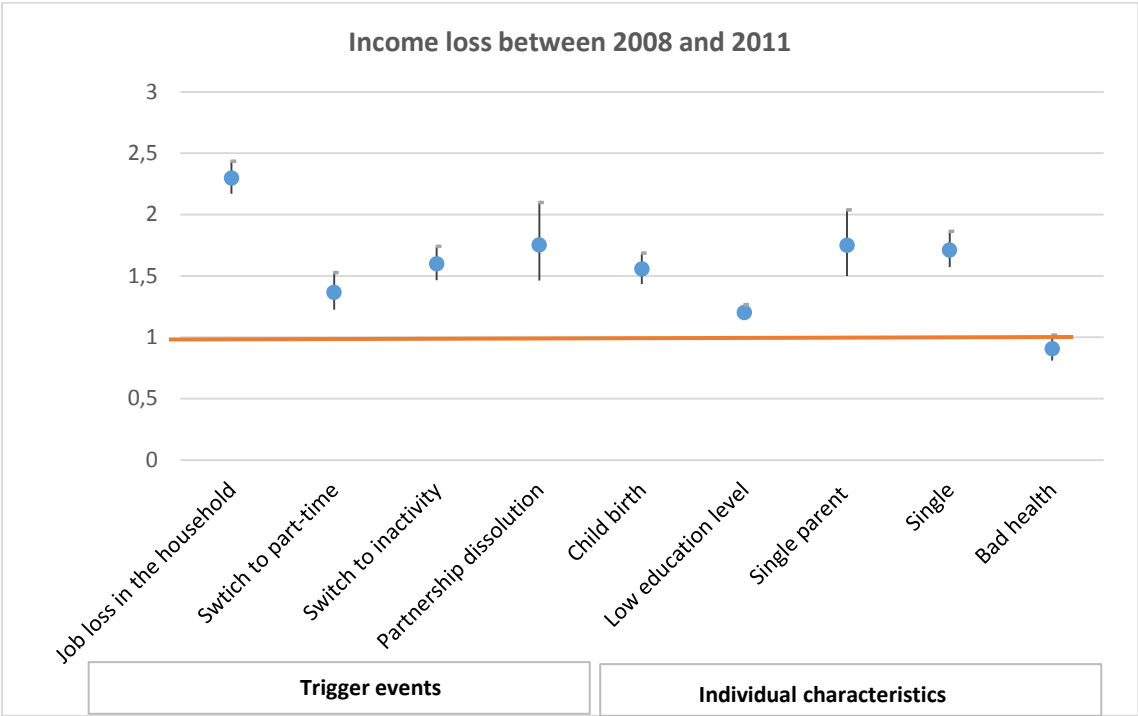
Source: EU-SILC 2011 longitudinal data, Users' database - August 2013

Job loss has a number of consequences on the whole household, ranging from a reduction in the standards of living, quality of life and social participation.

Figure 7 illustrates very clearly the impact of loss of employment on the risk of experiencing a drop in income and the experience of material deprivation. Specifically, it presents the odds ratios of two outcomes for adults who experienced a range of trigger events. The two outcomes shown at the top and bottom of Figure 7 are:

- A drop in equivalised household income of more than 20% between 2008 and 2011;
- An entry into material deprivation in either 2009, 2010 or 2011

**Figure 7: Impact of different trigger events on income loss and deprivation, people aged 18-59 years, EU, Odds ratio, logistic regression, robust standard error**



Source: EU-SILC 2011 longitudinal data, Users' database - August 2013

Odds ratio (OR) are one of the main ways to quantify how strongly the presence or absence of an event/characteristic A is associated with the presence or absence of an event/characteristic B in a given population. If the OR is significantly greater than one, then

the event/characteristic “A” is considered to be positively “associated” with the event/characteristic “B” in the sense that experiencing “A” raises (relative to not-experiencing “A”) the odds of experiencing “B”. In Figure 7, loss of employment appears as the main risk factor for both outcomes (odds ratio of around 2.5). Other job related factors, such as change to part-time hours or inactivity are also associated with income loss (but not with the experience of material deprivation). Other demographic factors such as partnership dissolution, child birth, and becoming single or a single parent increase the risk of losing income and/or entering into material deprivation. Bad health also increases the probability of entering into deprivation. This confirms previous results (see Fusco, Guio, Marlier, 2010<sup>9</sup>) showing that the presence of at least one person in bad health in the household seems to have no significant impact on the risk of income poverty but is associated with higher risk of material deprivation.

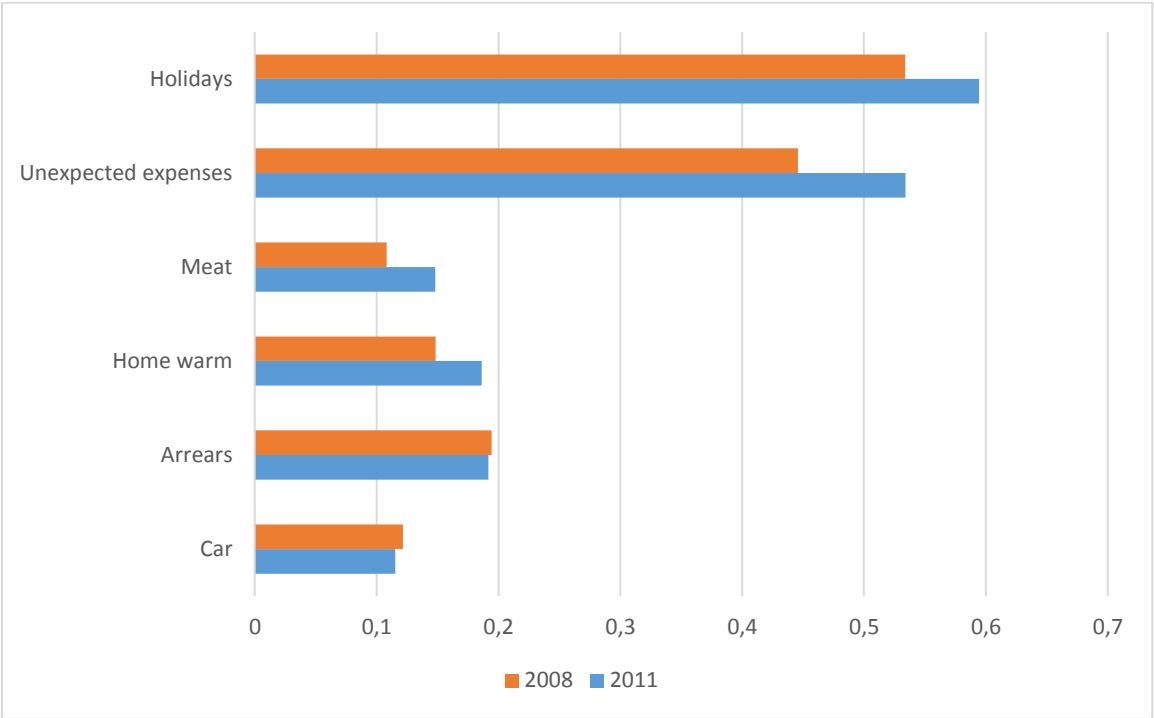
Other factors are also likely to shape the relationship between unemployment and reduction in resources and deprivation and were not tested: for example, the income of other household members and relatives, the length of unemployment and the degree of income replacement via social transfers may prevent the experience of poverty and deprivation.

Some adults living in households where at least one loss of employment was experienced had to curtail their consumption as a result of the drop in income; comparing their deprivation between 2008 (before job loss) and 2011 (after), we can identify the items which were most heavily curtailed. Figure 8 shows that at the EU level, holidays deprivation and inability to face unexpected expenses are the two items which increased the most, followed by the inability (due to insufficient income) to afford meat/fish/chicken each second day and keep one’s home adequately warm. Variation in arrears and lack of car are not significant. The second part of the report will try to highlight whether there exists a common deprivation order at the national and EU level.

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<sup>9</sup> Fusco, A., Guio, A.-C. and Marlier, E (2010). Characterising the income poor and the materially deprived in European countries. In: Atkinson A.B. and Marlier E. (eds.), *Income and living conditions in Europe*, Luxembourg: Office for Official Publications of the European Communities (OPOCE), pp.133-153.

**Figure 8: Proportion of people lacking each item (2008 and 2011), among people who live in household with at least one job loss between 2008 and 2011<sup>10</sup>, EU**



Source: EU-SILC 2011 longitudinal data, Users' database - August 2013

<sup>10</sup> Only people who are not back to work are included.



## PART 2: The Deprivation order

In order to highlight the order in which different items are curtailed in different countries, two models are estimated on two data sets:

- The Deprivation Sequence is first estimated on a set of 13 deprivation items available for the first time in the 2009 EU-SILC cross-sectional data. This 13-item index was proposed by Guio, Gordon and Marlier (2012)<sup>11</sup> as suitable, valid and reliable items of deprivation. Among these 13 items, six items are also included in the current material deprivation indicator presented in Part 1 (see Annex 1 for a presentation of the material deprivation indicators used in the paper).
- The longitudinal extension of the Deprivation sequence, developed in this report, is estimated on six out of the 13 items because only six items (out of the 13 items) are available in the EU-SILC longitudinal data (2009-2011).

The Deprivation Sequence methodology developed by Deutsch and Silber (2008)<sup>12</sup> searches for the most representative order of curtailment in cross-sectional data (see Deutsch, Guio, Pomati, Silber (2013))<sup>13</sup>. This report reviews the main findings of Deutsch, Guio, Pomati, Silber (2013) and extends the method to longitudinal data. More details about this methodology are given in Annex 3. Descriptive analysis and Item Response Theory are also used to validate the findings.

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<sup>11</sup> Guio, A.-C., Gordon D. and Marlier E. (2012), Measuring material deprivation in the EU: Indicators for the whole population and child-specific indicators, Eurostat Methodologies and working papers, Luxembourg: Office for Official Publications of the European Communities (OPOCE).

<sup>12</sup> Deutsch, J. and J. Silber (2008) 'The Order of Acquisition of Durable Goods and the Multidimensional Measurement of Poverty' in *Quantitative Approaches to Multidimensional Poverty Measurement*, N. Kakwani and J. Silber, editors, Palgrave-Macmillan.

<sup>13</sup> Deutsch, J., Guio, A.-C, Pomati, M. and Silber (2013), "Material deprivation in Europe: Which expenditures are curtailed first?", Paper presented at the Impalla conference, Luxembourg.

## Section 2.1: The cross-sectional Deprivation Sequence: analysis of an enlarged list of

### 13 robust MD items

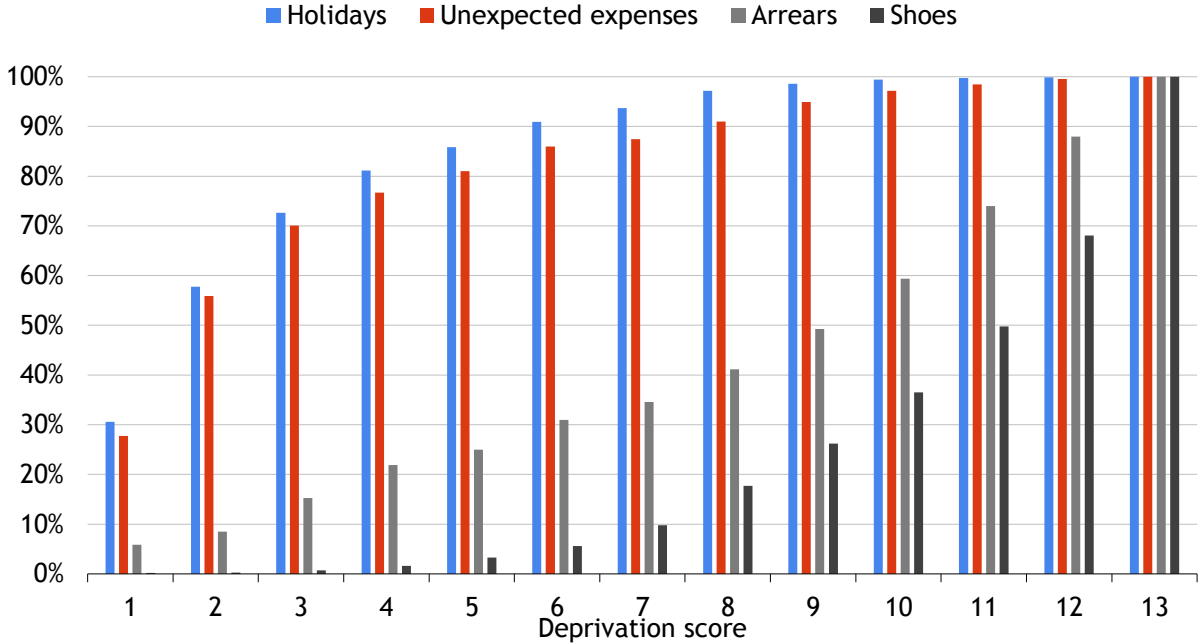
#### 2.1.1 Introduction and rationale

Descriptive analysis suggests that 90% of those who can't afford two pairs of all-weather shoes also cannot afford a holiday, while fewer than 10% who can't afford the latter can't afford shoes (EU-SILC 2009). This would suggest that as resources (such as income) begin to decrease people tend to curtail their holidays and it is only when their resources are extremely low that they lose the ability to afford even very basic goods like shoes. One way to corroborate this claim visually is to divide respondents according to how many items they can't afford (number of deprivations) as shown in Figure 10, here ranging from 1 to 13.

Figure 10 shows that holidays and unexpected expenses deprivations are much more widespread than arrears and shoes deprivations across the deprivation scale. More than half of those who can't afford two necessities can't afford holidays or unexpected expenses, and this proportion grows gradually with the number of deprivations. In contrast only a small proportion cannot afford to pay arrears or two pairs of shoes. However, this small proportion grows gradually with the number of deprivations. Most importantly, the order (holidays, unexpected expenses, arrears and shoes) is constant across the deprivation scale.

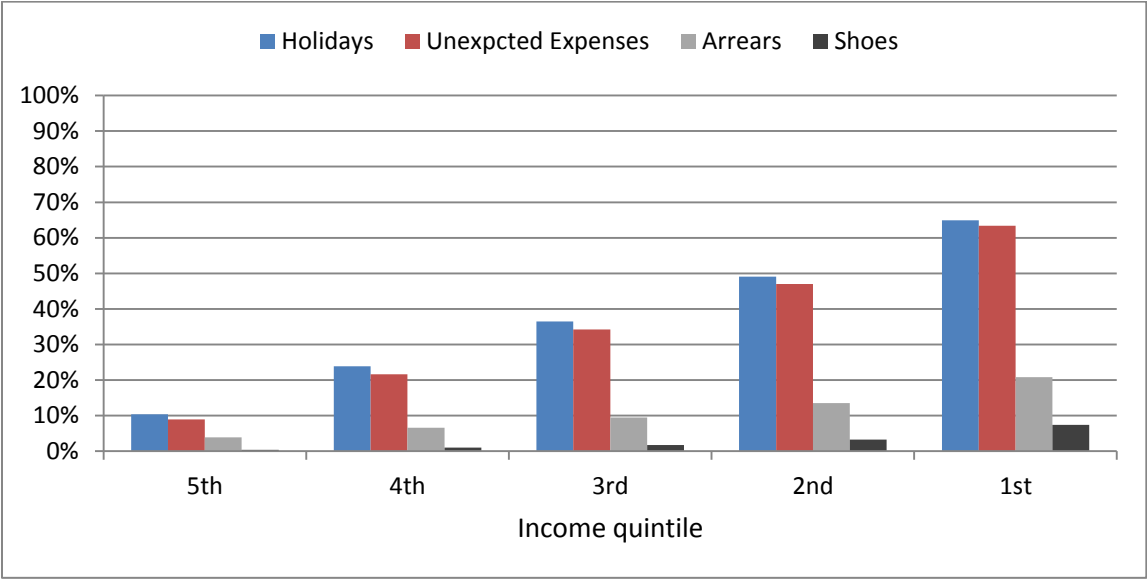
A very similar pattern emerges by dividing respondents into income quintiles (see Figure 11). In this case, the most likely order of curtailment at the EU level is clearly holidays, unexpected expenses, arrears and finally shoes. Figure 10 and 11 also help to explain the volatility of holiday and arrears deprivation rates shown in Table 1 among countries that saw no significant increase or decrease in Material Deprivation rates; a large proportion of people experience these two deprivations even though they are not identified as suffering from MD (because they lack one or two items and not three or more, they are not considered as suffering from MD). This would suggest that the deprivation rates for these two necessities are therefore influenced not only by how many people enter or exit MD, but also by minor changes in income. This is illustrated by the Figure 12, which presents the proportion of people who lacked each item the year before their entry into deprivation. This shows that a large proportion of those entering into deprivation in T were already lacking holidays and could not face unexpected expenses in T-1, but the majority of them did not experience the other deprivations.

**Figure 10: Percentage who can't afford each item, by level of deprivation, EU level**



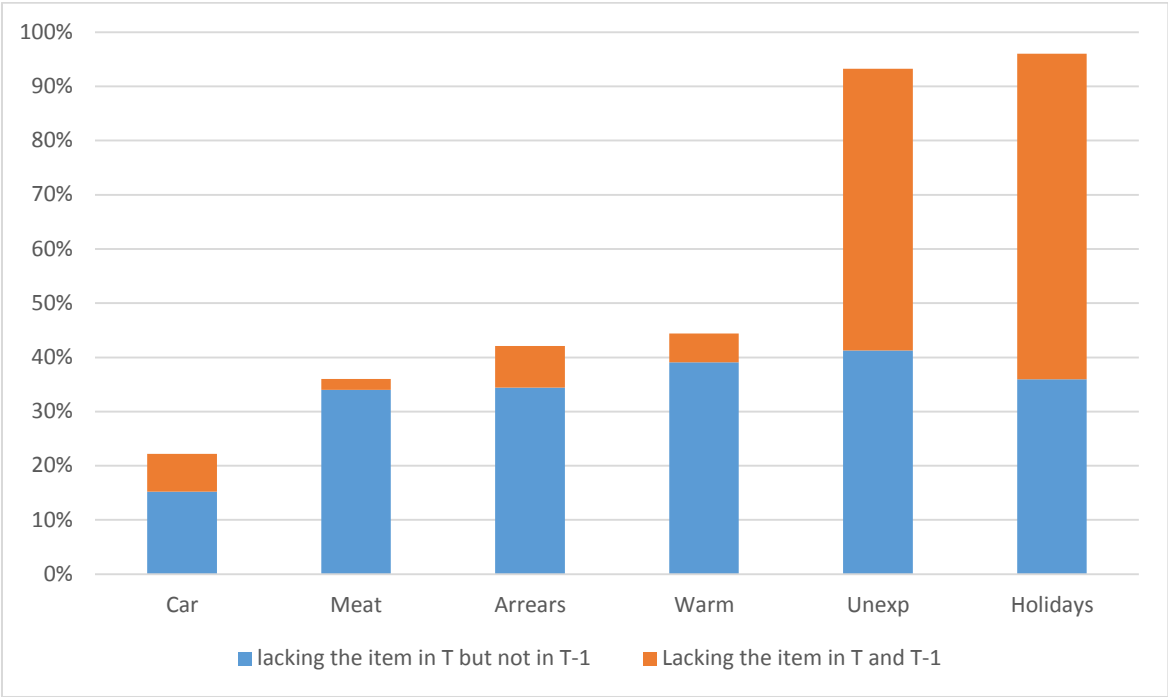
Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computation

**Figure 11: Percentage who can't afford each item, by income quintile, EU level**



Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computation

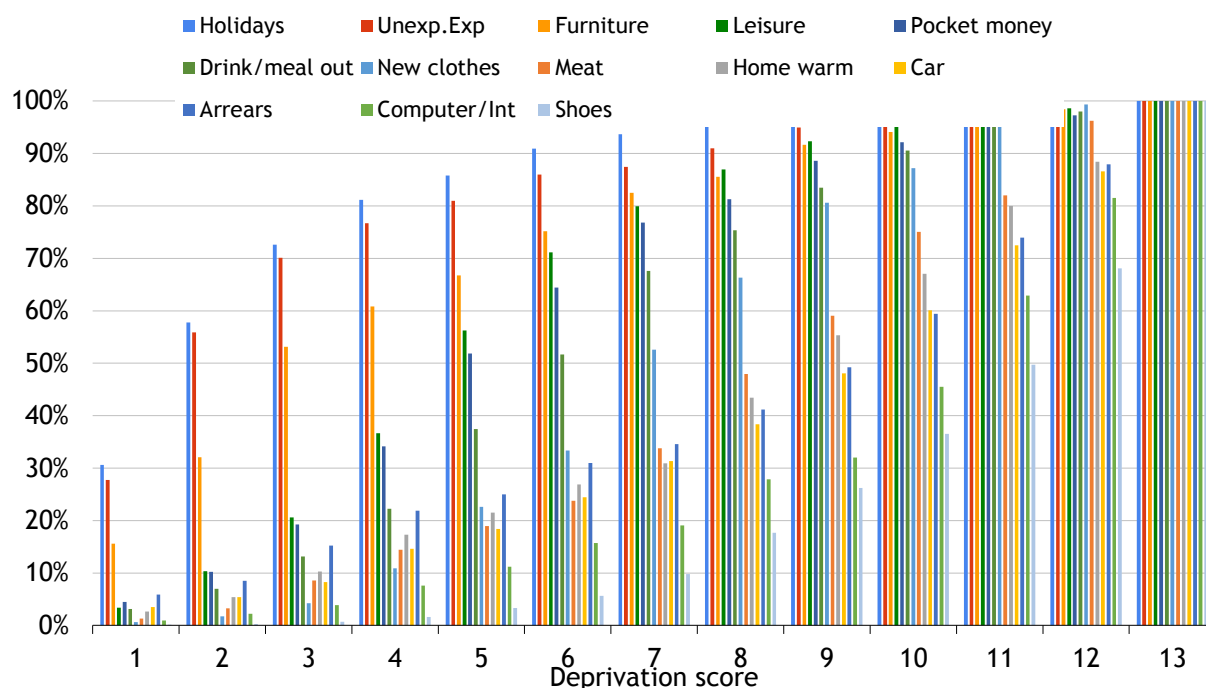
**Figure 12: Percentage of people who can't afford each item, in T (year of entry into Material Deprivation) and T-1 (year before the entry into MD), EU level**



Source: EU-SILC longitudinal data, Users' database - August 2013, authors' computation

This order is nevertheless probabilistic: although on average respondents will conform to this pattern, it does not necessarily apply perfectly to all respondents. Similarly to a model prediction, there is always some degree of difference between observed and predicted orders: even when considering the four items above there is a small minority of people who can't afford to pay arrears nor afford two pairs of shoes but who are able to afford holidays. This could be the result of misreporting and/or unique individual factors and particular resources which set this rare group of cases apart from the vast majority of the population. As the number of deprivation items increases the relative frequency order will become more uncertain and the number of cases that do not confirm exactly to the best order of curtailment will also increase. As shown in Figure 13, the order for holidays, unexpected expenses and shoes remains constant across the deprivation scale, while the order is less clear for other items (such as car and arrears) across the deprivation scale. Finding the most representative order of curtailment for 20 countries visually would be unfeasible, and more advanced methods are therefore needed.

**Figure 13: Proportion of people who can't afford the item, by level of deprivation, EU level**



Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computation

### 2.1.2 Results

Because of the issues outlined above, we used an iterative method, i.e. the Deprivation Sequence method (Deutsch and Silber, 2008), which compares each individual deprivation profile in the sample with every single possible deprivation order, and returns the best approximation out of all the possible orders (the Deprivation Sequence).

The best order is the one which can accommodate all the different individual patterns with the least amount of error (see Annex 3). At the EU level this order is:

- 1) Holidays
- 2) Unexpected expenses
- 3) Furniture
- 4) Pocket Money
- 5) Leisure
- 6) Drink/meal out
- 7) Clothes
- 8) Meat/chicken/fish
- 9) Home warm
- 10) Arrears
- 11) Car
- 12) Computer/Internet
- 13) Shoes

As their resources decrease, households on average tend to first cut back on their annual holidays and use up their savings (resulting in inability to face unexpected expenses), then are unable to afford new furniture, pocket money, leisure and social activities and as their resources decrease even further they are even unable to afford meals, a warm house and paying the bills, and eventually even two pairs of all-weather shoes.

The heat map in Table shows the country-specific results. A one-week annual holiday is always among the first three expenditures to be curtailed and this is also the case for unexpected expenses, with the exception of two countries, Portugal and Romania (where unexpected expenses is the 7<sup>th</sup> or 8<sup>th</sup> item to be curtailed). Similarly shoes are at least the eighth item to be given up and the same applies to access to internet or a computer. Overall, the heat-map shows a large degree of overlap between the deprivation sequences of different countries. Hence, despite the large diversity in deprivation levels within the EU, these results tend to show a very similar deprivation order in most countries. Items in the middle of the order (meal, warm, car and arrears) show the greatest cross-country variability, and section 2.3 will provide explanation for this.

**Table 2: Best order of curtailment, EU countries**

	EU-27	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
<b>Holidays</b>	1	2	1	3	2	2	2	2	1	2	1	2	3	2	2	1	2	2	2	1	3	1	1	1	2	3	1	2
<b>Unexp. expenses</b>	2	1	2	4	3	3	1	1	3	3	3	1	2	1	1	2	1	1	1	3	1	2	8	7	1	1	3	1
<b>Furniture</b>	3	5	3	1	1	1	6	3	2	1	2	3	1	3	3	11	3	3	3	2	2	3	2	2	6	2	2	6
<b>Leisure</b>	5	3	4	8	6	6	4	6	7	6	5	7	5	5	7	4	4	5	5	5	4	4	5	4	5	5	7	4
<b>Pocket money</b>	4	4	6	6	8	5	5	5	5	8	4	6	4	6	5	3	5	4	6	6	5	5	4	5	4	7	6	3
<b>Drink/ meal out</b>	6	6	5	7	9	10	3	7	8	9	6	8	8	4	6	5	6	6	7	4	6	6	6	3	8	9	8	5
<b>Clothes</b>	7	8	7	5	7	9	8	4	6	7	8	5	7	7	13	6	7	7	4	7	7	7	7	8	7	6	9	7
<b>Meat/ chicken/ fish</b>	8	7	10	9	10	4	7	10	9	10	13	9	9	8	11	8	8	10	8	8	12	8	12	9	11	8	4	9
<b>Home warm</b>	9	12	9	2	4	11	9	12	13	5	9	12	11	11	9	7	9	11	11	9	11	9	3	10	12	10	13	8
<b>Car</b>	11	10	11	11	12	7	12	11	4	12	12	10	12	10	8	13	10	12	9	11	9	11	10	6	9	12	5	12
<b>Arrears</b>	10	9	8	10	5	12	10	8	10	4	7	4	6	9	4	9	11	9	10	10	8	10	13	11	3	4	11	11
<b>Computer Internet</b>	12	11	12	12	13	8	13	13	11	11	10	11	13	12	10	10	12	13	12	12	13	12	11	12	13	11	10	13
<b>Shoes</b>	13	13	13	13	11	13	11	9	12	13	11	13	10	13	12	12	13	8	13	13	10	13	9	13	10	13	12	10

Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computation

We also checked whether the results obtained vary within a given country from one population subgroup to the other. We derived the Deprivation Sequence for five population subgroups within each country: households with two adults or more, with and without children, single households, single households older or younger than 65. Table 3 presents a measure of fit (the reproducibility coefficient) when the national order is applied to each subgroups (e.g. when, in AT, the national order presented in Table 2 is applied to single parents, the fit is 0.92).

Most coefficients are higher than 0.9 (the usual threshold for the reproducibility coefficient)<sup>14</sup>. We can therefore conclude that the country Deprivation Sequence can be applied to the different population subgroups for the vast majority of subgroups. It also shows that those countries with an overall index below 0.9 are also more likely to have subgroup indices below this threshold. In other words, those countries where establishing a representative deprivation pattern is marginally harder than in other countries also have subgroup deprivation patterns with an index below 0.9. Lone parents in particular emerge as having deprivation patterns which conform slightly less to the national pattern. Nevertheless, all indices are either above or just below 0.9, showing a large degree of conformity across all five groups with the respective national deprivation sequence.

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<sup>14</sup> The longitudinal analysis in the next section provides further corroboration of the good fit of this model by ranking the fit of all the possible orders.



**Table 3: Reproducibility coefficients for the various population subgroups within a country, assuming the Deprivation Sequence is that of the country as a whole**

Country	Households without children	Households with children	Single parents households	Single households older than 65	Single households 65 years old or less	Overall
AT	0.97	0.96	0.92	0.94	0.95	0.96
BE	0.97	0.97	0.91	0.95	0.93	0.96
BG	0.88	0.89	0.89	0.89	0.89	0.89
CY	0.95	0.96	0.93	0.93	0.94	0.95
CZ	0.96	0.96	0.90	0.95	0.94	0.95
DE	0.96	0.96	0.91	0.95	0.94	0.96
DK	0.99	0.98	0.94	0.97	0.96	0.98
EE	0.94	0.95	0.92	0.93	0.92	0.94
EL	0.92	0.93	0.89	0.91	0.91	0.92
ES	0.96	0.96	0.93	0.96	0.95	0.96
FI	0.98	0.98	0.95	0.95	0.95	0.98
FR	0.96	0.96	0.92	0.95	0.94	0.96
HU	0.92	0.91	0.89	0.90	0.90	0.91
IE	0.97	0.96	0.90	0.97	0.94	0.96
IT	0.97	0.96	0.95	0.96	0.96	0.96
LT	0.90	0.91	0.88	0.89	0.89	0.91
LU	0.99	0.98	0.94	0.99	0.97	0.98
LV	0.90	0.90	0.87	0.88	0.88	0.90
MT	0.95	0.94	0.91	0.94	0.93	0.94
NL	0.99	0.99	0.95	0.98	0.96	0.98
PL	0.92	0.93	0.88	0.91	0.90	0.92
PT	0.93	0.93	0.89	0.92	0.92	0.93
RO	0.88	0.88	0.86	0.86	0.87	0.88
SE	0.98	0.98	0.96	0.96	0.97	0.98
SI	0.94	0.95	0.92	0.92	0.92	0.95
SK	0.93	0.93	0.90	0.90	0.91	0.93
UK	0.97	0.96	0.91	0.97	0.95	0.96

Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computation

## Section 2.2: The longitudinal Deprivation Sequence

The Deprivation Sequence method has, to date, only been used on cross-sectional data (Deutch and Silber, 2008; Deutch, Guio, Pomati and Silber, forthcoming). To validate the results it is however crucial to follow individuals as they become more or less deprived across time. The analysis below corroborates the found order by extending the Deprivation Sequence to the analysis of longitudinal data. More details about this method are given in Annex 3.

The best orders of curtailment for both cross-sectional (2009) and longitudinal data (2009-2011, obtained by analysing the same individuals during three consecutive waves) are shown below in

Focusing on the differences between national best orders however hides the fact that the EU order fits most countries relatively well. As shown in Table 5, out of 720 possible longitudinal hierarchies the EU order has a rank of less than 55 in all countries apart from Denmark and Finland. This means that the EU order may not be the best fitting one but it fits better than 92% (i.e. 55/720) of all the other possible hierarchies in most countries. The orders that fit marginally better are substantially small variations of the EU order. For Denmark and Finland the EU order is still better than the vast majority of orders but the rank is much lower (134 and 154 respectively). The fourth column also shows that any order with holidays and unexpected expenses at end of the order fits all countries badly.

Table 4 (for six items (out of 13) available in the longitudinal data set). The cross-sectional and longitudinal best orders show a substantial amount of overlap. At the national level, the hierarchies show either a perfect or very close match. This suggests that the 13-item order shown above can be considered a good predictor of the longitudinal deprivation sequence.

Similarly to the cross-sectional results there is also a large degree of overlap between national hierarchies: holidays and expenses are generally the first items to be curtailed across all countries. As for the other items, most countries have an order similar to the EU one, but the variation is much more noticeable. Bulgaria and Portugal for example are the only countries where the enforced lack of an adequately warm house is first and second respectively. Similarly, access to a car is the second/third item in Romania.

Focusing on the differences between national best orders however hides the fact that the EU order fits most countries relatively well. As shown in Table 5, out of 720 possible longitudinal hierarchies the EU order has a rank of less than 55 in all countries apart from Denmark and Finland. This means that the EU order may not be the best fitting one but it fits better than 92% (i.e. 55/720) of all the other possible hierarchies in most countries. The orders that fit marginally better are substantially small variations of the EU order. For Denmark and Finland the EU order is still better than the vast majority of orders but the rank is much lower (134 and 154 respectively). The fourth column also shows that any order with holidays and unexpected expenses at end of the order fits all countries badly.

**Table 4: Best order of curtailment, longitudinal and cross-sectional data, EU countries**

		EU-27	AT	BE	BG	CY	CZ	DK	EE	ES	FI	HU	IT	LT	LU	LV	MT	NL	PL	PT	RO	UK
Holidays	CS	1	2	1	2	1	1	2	1	1	2	2	1	2	2	2	1	2	1	1	1	2
	LONGI	1	2	1	2	1	1	2	1	1	2	2	1	2	2	2	1	2	1	1	1	2
Unexp. expenses	CS	2	1	2	3	2	2	1	2	2	1	1	2	1	1	1	2	1	2	3	3	1
	LONGI	2	1	2	3	2	2	1	2	2	1	1	2	1	1	1	2	1	2	3	2	1
Meat/ chicken/ fish	CS	3	3	5	4	5	3	4	4	6	4	3	4	3	4	3	3	6	3	5	4	4
	LONGI	3	3	5	4	5	4	4	4	5	5	3	5	4	4	3	3	5	3	6	6	5
Home warm	CS	4	6	4	1	3	5	6	6	4	6	6	3	4	5	6	4	5	4	2	5	3
	LONGI	4	6	4	1	3	5	5	6	4	6	6	4	3	5	6	6	4	4	2	5	4
Arrears	CS	5	4	3	5	4	6	3	5	3	3	4	5	6	3	5	5	3	5	6	6	5
	LONGI	5	4	3	5	4	6	3	3	3	3	4	3	6	3	5	4	3	5	5	4	3
Car	CS	6	5	6	6	6	4	5	3	5	5	5	6	5	6	4	6	4	6	4	2	6
	LONGI	6	5	6	6	6	3	6	5	6	4	5	6	5	6	4	5	6	6	4	3	6

Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, and EU-SILC 2011 longitudinal data, Users' database - August 2013. Notes: CS: cross-sectional order; LONGI: longitudinal order.

**Table 5: Rank of the EU order in each country**

Country	Rank of EU order <sup>15</sup>	Highest rank of order with holidays and unexpected expenses as last (5th and 6th respectively)
Poland	1	515
Czech Republic	3	435
Malta	4	517
Italy	6	478
Bulgaria	8	483
Romania	13	498
Estonia	15	520
Hungary	16	519
Belgium	17	478
Lithuania	17	429
Spain	19	431
Austria	20	478
Cyprus	30	425
Latvia	30	541
United Kingdom	33	466
Portugal	46	381
Luxembourg	53	343
Netherlands	54	415
Denmark	134	355
Finland	162	251

Source: EU-SILC 2011 longitudinal data, Users' database - August 2013

The key message from the results above is that whereas the order of curtailment for holidays and unexpected expenses is very similar across all countries, the other four items show more variability (either in cross-sectional or in longitudinal analysis). Nevertheless, the EU order revealed by the cross-sectional and longitudinal Deprivation Sequence methods provides a good approximation of the order of curtailment of these four items. The section below uses a different method to further validate these results.

<sup>15</sup> 1) Holidays, 2) Unexpected expenses, 3) Meal, 4) Warm , 5) Arrears, 6) Car

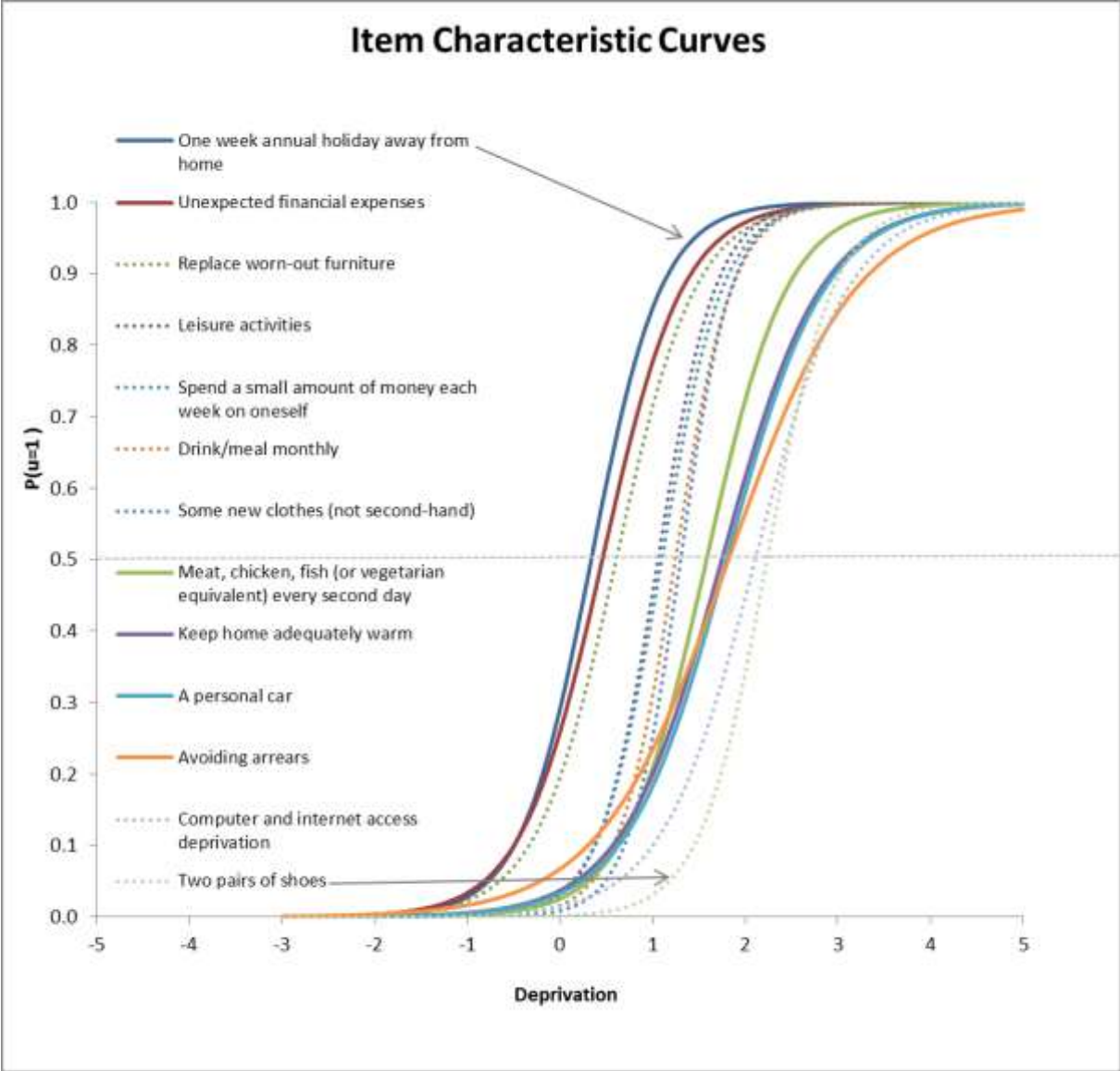
### Section 2.3: Deprivation severity associated with each item

This section provides a potential explanation for the findings shown above: the bottom four items in the order indicate more severe levels of deprivation than holidays and unexpected expenses, but at these higher levels their respective ranks in the order are exchangeable. Figure 14 illustrates curves, named “Item Characteristic Curves (ICC)”<sup>16</sup>, which illustrate the relationship between the underlying deprivation trait (comparable to the deprivation score, or the sum of deprivations) and the probability of being deprived of each item: as deprivation (shown on the X-axis, expressed in standard deviations (s.d.) from the mean) increases, the probability of being deprived of an item (shown on the Y-axis) increases. The further to the right the ICC the more severe the deprivation. The curves are ordered by the EU deprivation order (see section 2.1), and the dotted curves indicate item not present in the longitudinal element of the EU-SILC. The ICCs for the first two items in the order (i.e. holidays and unexpected expenses) show variation between -1 and 1 s.d.: as argued above these items detect the first signs of a drop in resources such as income, and the vast majority of those who suffer from more extreme levels of material deprivation (e.g above 1 s.d.) cannot afford these. Looking at the horizontal distance between the curves (shown by the dashed horizontal line) shows that the ICCs for these two items are close together but far apart from the other four items; the severity of deprivation associated with these two deprivations is distinctively lower than that of the other four items. However, at higher levels of deprivation the probabilities of being deprived of these four items at the bottom of the order (meal, warm, car and arrears) are very similar; the curves are so close together that it is difficult to tell them apart, and therefore the order of curtailment for these items is much harder to establish. These results give a potential explanation of why there is greater variability in the order of curtailment of these items at national level and yet the EU order shows on average a good fit across most countries. These four items indicate more severe levels of deprivation than holidays and unexpected expenses, but their respective ranks in the order are exchangeable.

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<sup>16</sup> Item Response Theory (IRT) is a set of statistical models that can be used to postulate the relationships between each deprivation item and the underlying deprivation level, shown graphically with Item Characteristic Curves. Similarly to the Deprivation Sequence, this relationship is found by searching the data, until the best model (the one with the lowest amount of error) is found.

Figure 14: Item Characteristic Curves (ICCs), 13 items (cross-sectional data), EU level



Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computation

The ICCs also corroborate the results from Figure 10, 11 and 12: not being able to afford two pairs of shoes is associated with extremely high levels of deprivation (the probability of enforced lack begins to rise only at levels of deprivation above 1 s.d.), and therefore this represents the very last item to be curtailed for most countries and population subgroups. The ICCs also reiterate the need to have a broad range of items that capture all levels of deprivation, in both the cross-sectional and longitudinal component of the survey

## Conclusions

Overall, the analysis presented above presents a detailed and rich narrative of the way households curtail expenditure as they face changes in resources. Most importantly, the Deprivation Sequence confirms that there is an EU-wide pattern of curtailment. As their resources decrease, households first cut back on their annual holidays, their saving to face unexpected expenses, new furniture, leisure and social activities and as their resources decrease even further they are unable to afford meals, a warm house and paying the bills, and eventually even two pairs of all-weather shoes. The longitudinal analysis confirms that this pattern is also found when following the same people across time. Questions on extreme deprivations such as two pairs of shoes are however needed in the longitudinal element of the EU-SILC to further corroborate the cross-sectional results.

This type of analysis is also extremely important to confirm the validity and reliability of the EU deprivation measures. It shows that the 13 item scale proposed by Guio, Gordon and Marlier (2012) can be used to understand the severity of material deprivation experienced by a given country or subgroup. Across the European Union, the fact that a deprivation order where holidays are curtailed last shows such a bad fit across all countries also provides evidence against claims that poverty is the result of erratic spending or inefficient household budgeting: the vast majority of those without basic items such as shoes cannot afford holidays nor have enough money to face unexpected expenses. As shown by previous research, as income rises among those who suffered from deprivation, commodity expenditure patterns converge with those of higher-income households (Farrell and O'Connor, 2003; Gregg, Waldfogel and Washbrook, 2005)<sup>17</sup>. The results above suggest that the opposite is also true, showing a common deprivation trajectory.

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<sup>17</sup> Farrell, C. and O'Connor, W. (2003) Low-income families and household spending. Norwich: Department for Work and Pensions. Gregg, P., Waldfogel, J. and Washbrook, E. (2005) 'That's the way the money goes: expenditure patterns as real incomes rise for the poorest families with children', *A more equal society*, pp. 251–275.



## Annex 1: material deprivation indicators – definitions

### Official EU material deprivation indicators: standard and severe material deprivation

Based on the information available from the EU Statistics on Income and Living Conditions (EU-SILC) data-set, the “standard” EU MD rate is currently defined as the proportion of people living in households who cannot afford at least three of the following nine items:

1. coping with unexpected expenses;
2. one week’s annual holiday away from home;
3. avoiding arrears (in mortgage or rent, utility bills or hire purchase instalments);
4. a meal with meat, chicken, fish or vegetarian equivalent every second day;
5. keeping the home adequately warm;
6. a washing machine;
7. a colour TV;
8. a telephone;
9. a personal car.

In June 2010, EU leaders launched the new “Europe 2020 Strategy” and set in this context an EU social inclusion target, which consists of lifting at least 20 million people out of the risk of poverty or social exclusion in the EU by 2020, which is based on three indicators. One of them is a measure of “severe” deprivation, which is built in the same way as the “standard” measure but with a threshold set at four rather than three enforced lacks.

### Proposed revised material deprivation indicator based on 13 items collected in the cross-sectional EU-SILC survey (2009)

In view of the revision of the current material deprivation indicator, Guio, Gordon and Marlier (2012)<sup>18</sup> analysed the full set of material deprivation items included in the 2009 thematic module on material deprivation and the core survey and proposed a selection of 13 material deprivation items which passed various robustness tests. These items, presented below, cover some key aspects of living conditions which appear to be customary in the whole EU and from which some people are excluded due to a lack of resources (and not because by choice – *enforced lack*).

- a) “Adult items”, i.e. items collected at individual adult level (people aged 16+, living in private households). The adult deprivation information is assigned to all household members (including children), if at least half the adults in the household cannot afford the item. The five items are:
  1. to replace worn-out clothes by some new (not second-hand) ones;
  2. to afford two pairs of properly fitting shoes, including a pair of all-weather shoes;

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<sup>18</sup> Guio, A.-C., Gordon D. and Marlier E., 2012, *Measuring material deprivation in the EU: Indicators for the whole population and child-specific indicators*, Eurostat Methodologies and working papers, Luxembourg: Office for Official Publications of the European Communities (OPOCE).

3. to spend a small amount of money each week on oneself without having to consult anyone (hereafter referred to as “pocket money”);
  4. to get together with friends/family for a drink/meal at least monthly;
  5. to have regular leisure activities;
- b) “Household items”, i.e. items collected at household level. The household deprivation information is assigned to all household members (including children) when the household cannot afford the item. The 8 items are:
6. to replace worn-out furniture (but would like to have);
  7. to afford a meal with meat, chicken, fish or vegetarian equivalent every second day;
  8. to face unexpected expenses;
  9. to keep home adequately warm;
  10. to afford one week annual holiday away from home;
  11. to avoid arrears (mortgage or rent, utility bills or hire purchase instalments)
  12. to afford/ have access to a car/van for private use (but would like to have)
  13. to afford a computer and an internet connection (but would like to have)

#### Subset of 6 items available in the longitudinal EU-SILC survey

The longitudinal element of EU-SILC contains six of the original 13 items, which measure the affordability:

1. to have a meal with meat, chicken, fish or vegetarian equivalent every second day;
2. to face unexpected expenses;
3. to keep home adequately warm;
4. to have one week annual holiday away from home;
5. to avoid arrears (mortgage or rent, utility bills or hire purchase instalments)
6. to have access to a car/van for private use (but would like to have)

#### Annex 2: EU countries’ official abbreviations

“Old” Member States		“New” Member States	
<b>BE</b>	Belgium	<b>2004 Enlargement</b>	
<b>DK</b>	Denmark	<b>CZ</b>	Czech Republic
<b>DE</b>	Germany	<b>EE</b>	Estonia
<b>IE</b>	Ireland	<b>CY</b>	Cyprus
<b>EL</b>	Greece	<b>LV</b>	Latvia
<b>ES</b>	Spain	<b>LT</b>	Lithuania
<b>FR</b>	France	<b>HU</b>	Hungary
<b>IT</b>	Italy	<b>MT</b>	Malta
<b>LU</b>	Luxembourg	<b>PL</b>	Poland
<b>NL</b>	The Netherlands	<b>SI</b>	Slovenia
<b>AT</b>	Austria	<b>SK</b>	Slovakia
<b>PT</b>	Portugal	<b>2007 Enlargement</b>	
<b>FI</b>	Finland		
<b>SE</b>	Sweden	<b>BG</b>	Bulgaria
<b>UK</b>	United Kingdom	<b>RO</b>	Romania

**Annex 3: The Deprivation Sequence methodology**

The Deprivation Sequence was developed by Deutsch and Silber (2008), drawing on work by Paroush (1973)<sup>19</sup> and Guttman (1950)<sup>20</sup>. This methodology compares the deprivation order of each case in a dataset to all the possible order. For example, if the questionnaire contains two questions on whether respondents can afford a one-week holiday a year and two pairs of shoes, there are two possible orders of curtailment: as resources decrease households could decide to curtail holidays first and then two pairs of shoes. Alternatively they could curtail two pairs of all-weather shoes, but still go on holiday. Assuming that data was collected on only these two items and that being able to afford or not wanting an item is scored as 0 and being deprived (unable to afford) is scored as 1, it is possible to test which order best approximates the one found among all cases in our sample. For example, if holidays were curtailed first, followed by shoes we would expect three possible patterns in the data consistent with this order:

Holidays	Shoes
0	0
1	0
1	1

Respondents would either be able to afford both holidays and shoes (as in the first row), or be unable to afford holidays and able to afford shoes (second row), or be unable to afford either (third row). Participants who can't afford shoes but can afford holidays (pattern 0,1) are in this case not consistent with the considered order and would need one change (an error) to be converted to the closest expected pattern (from 0,1 to 1,1). An error of 1 (or a residual in modelling terms) would then be allocated to this case. If the expected order was the opposite to the one above (shoes are curtailed first), we would expect the opposite patterns in the data.

Shoes	Holidays
0	0
1	0
1	1

We could then compare each case in our dataset to this pattern, and allocate errors to each case as we did above. We would then aggregate the total amount of error for each possible order. The best order is simply the order with the lowest aggregate error. In the presence of

<sup>19</sup> Paroush, J., 1963, "The Order of Acquisition of Durable Goods," Bank of Israel Survey (in Hebrew), September, (no.20): 47-61.

<sup>20</sup> Guttman, L. (1950). The basis for scalogram analysis. In Stouffer et al. *Measurement and Prediction*. The American Soldier Vol. IV. New York: Wiley.

longitudinal data we can extend the above by looking at information over multiple episodes (waves) for the same person. The expected longitudinal pattern for a given order rewards (similarly to the cross-sectional ones) consistency, but allows increase, decrease and no change in deprivation across time. Each case is then compared against the expected pattern, as shown below.

WAVE 1		WAVE 2	
Holidays	Shoes	Holidays	Shoes
0	0	0	0
0	0	1	0
1	0	0	0
0	0	1	1
1	0	1	0
1	1	0	0
1	0	1	1
1	1	1	0
1	1	1	1

*Note: expected longitudinal patterns for order of curtailment with holidays as the first item to be curtailed.*

#### Annex 4: Between countries Rank Correlation for Deprivation Sequences

	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	IE
AT	1.000	0.907	0.527	0.571	0.769	0.907	0.830	0.775	0.610	0.791	0.819	0.841	0.945	0.720
BE	0.907	1.000	0.753	0.808	0.648	0.901	0.874	0.742	0.824	0.923	0.857	0.885	0.962	0.780
BG	0.527	0.753	1.000	0.852	0.522	0.626	0.610	0.500	0.819	0.692	0.577	0.643	0.670	0.495
CY	0.571	0.808	0.852	1.000	0.445	0.621	0.703	0.478	0.973	0.791	0.736	0.802	0.681	0.681
CZ	0.769	0.648	0.522	0.445	1.000	0.577	0.582	0.813	0.495	0.549	0.621	0.637	0.725	0.549
DE	0.907	0.901	0.626	0.621	0.577	1.000	0.802	0.593	0.593	0.764	0.687	0.780	0.923	0.643
DK	0.830	0.874	0.610	0.703	0.582	0.802	1.000	0.780	0.681	0.841	0.885	0.929	0.879	0.626
EE	0.775	0.742	0.500	0.478	0.813	0.593	0.780	1.000	0.505	0.670	0.775	0.714	0.802	0.637
EL	0.610	0.824	0.819	0.973	0.495	0.593	0.681	0.505	1.000	0.813	0.802	0.797	0.703	0.731
ES	0.791	0.923	0.692	0.791	0.549	0.764	0.841	0.670	0.813	1.000	0.808	0.885	0.835	0.819
FI	0.819	0.857	0.577	0.736	0.621	0.687	0.885	0.775	0.802	0.808	1.000	0.890	0.857	0.758
FR	0.841	0.885	0.643	0.802	0.637	0.780	0.929	0.714	0.797	0.885	0.890	1.000	0.863	0.747
HU	0.945	0.962	0.670	0.681	0.725	0.923	0.879	0.802	0.703	0.835	0.857	0.863	1.000	0.747
IE	0.720	0.780	0.495	0.681	0.549	0.643	0.626	0.637	0.731	0.819	0.758	0.747	0.747	1.000
IT	0.775	0.747	0.522	0.484	0.379	0.846	0.632	0.385	0.495	0.659	0.571	0.571	0.703	0.473
LT	0.940	0.951	0.758	0.714	0.786	0.918	0.852	0.791	0.714	0.830	0.786	0.846	0.962	0.692
LU	0.857	0.890	0.610	0.703	0.588	0.879	0.956	0.709	0.659	0.885	0.791	0.934	0.885	0.692
LV	0.907	0.912	0.698	0.676	0.769	0.830	0.912	0.868	0.692	0.775	0.874	0.846	0.945	0.610
MT	0.890	0.967	0.786	0.747	0.725	0.912	0.835	0.753	0.753	0.857	0.786	0.841	0.967	0.698
NL	0.852	0.918	0.615	0.725	0.593	0.808	0.929	0.802	0.709	0.901	0.835	0.918	0.901	0.775
PL	0.940	0.973	0.769	0.758	0.764	0.923	0.863	0.769	0.764	0.868	0.813	0.874	0.962	0.709
PT	0.445	0.654	0.791	0.632	0.418	0.560	0.511	0.456	0.555	0.703	0.302	0.516	0.527	0.385
RO	0.764	0.813	0.599	0.500	0.681	0.725	0.643	0.808	0.505	0.714	0.582	0.643	0.824	0.604
SE	0.791	0.797	0.396	0.654	0.429	0.692	0.857	0.687	0.670	0.797	0.890	0.863	0.764	0.786
SI	0.808	0.868	0.648	0.841	0.626	0.703	0.835	0.648	0.896	0.808	0.951	0.912	0.835	0.736
SK	0.780	0.654	0.418	0.385	0.940	0.610	0.632	0.896	0.418	0.516	0.659	0.632	0.769	0.588
UK	0.874	0.885	0.681	0.648	0.560	0.956	0.841	0.610	0.599	0.813	0.665	0.802	0.868	0.610

Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computation

#### Annex 4 (cont.): Between countries Rank Correlation for Deprivation Sequences

	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	ALL(27)
AT	0.775	0.940	0.857	0.907	0.890	0.852	0.940	0.445	0.764	0.791	0.808	0.780	0.874	0.934
BE	0.747	0.951	0.890	0.912	0.967	0.918	0.973	0.654	0.813	0.797	0.868	0.654	0.885	0.962
BG	0.522	0.758	0.610	0.698	0.786	0.615	0.769	0.791	0.599	0.396	0.648	0.418	0.681	0.780
CY	0.484	0.714	0.703	0.676	0.747	0.725	0.758	0.632	0.500	0.654	0.841	0.385	0.648	0.747
CZ	0.379	0.786	0.588	0.769	0.725	0.593	0.764	0.418	0.681	0.429	0.626	0.940	0.560	0.769
DE	0.846	0.918	0.879	0.830	0.912	0.808	0.923	0.560	0.725	0.692	0.703	0.610	0.956	0.918
DK	0.632	0.852	0.956	0.912	0.835	0.929	0.863	0.511	0.643	0.857	0.835	0.632	0.841	0.868
EE	0.385	0.791	0.709	0.868	0.753	0.802	0.769	0.456	0.808	0.687	0.648	0.896	0.610	0.780
EL	0.495	0.714	0.659	0.692	0.753	0.709	0.764	0.555	0.505	0.670	0.896	0.418	0.599	0.753
ES	0.659	0.830	0.885	0.775	0.857	0.901	0.868	0.703	0.714	0.797	0.808	0.516	0.813	0.874
FI	0.571	0.786	0.791	0.874	0.786	0.835	0.813	0.302	0.582	0.890	0.951	0.659	0.665	0.819
FR	0.571	0.846	0.934	0.846	0.841	0.918	0.874	0.516	0.643	0.863	0.912	0.632	0.802	0.879
HU	0.703	0.962	0.885	0.945	0.967	0.901	0.962	0.527	0.824	0.764	0.835	0.769	0.868	0.956
IE	0.473	0.692	0.692	0.610	0.698	0.775	0.709	0.385	0.604	0.786	0.736	0.588	0.610	0.720
IT	1.000	0.742	0.681	0.665	0.703	0.577	0.769	0.484	0.489	0.621	0.571	0.346	0.868	0.775
LT	0.742	1.000	0.879	0.951	0.962	0.885	0.989	0.654	0.819	0.703	0.802	0.764	0.918	0.984
LU	0.681	0.879	1.000	0.852	0.863	0.940	0.890	0.604	0.676	0.824	0.780	0.615	0.918	0.896
LV	0.665	0.951	0.852	1.000	0.912	0.879	0.940	0.527	0.769	0.747	0.841	0.786	0.830	0.934
MT	0.703	0.962	0.863	0.912	1.000	0.857	0.978	0.692	0.868	0.665	0.797	0.731	0.874	0.973
NL	0.577	0.885	0.940	0.879	0.857	1.000	0.879	0.588	0.758	0.863	0.808	0.637	0.841	0.874
PL	0.769	0.989	0.890	0.940	0.978	0.879	1.000	0.676	0.824	0.731	0.835	0.742	0.918	0.995
PT	0.484	0.654	0.604	0.527	0.692	0.588	0.676	1.000	0.703	0.291	0.346	0.330	0.681	0.681
RO	0.489	0.819	0.676	0.769	0.868	0.758	0.824	0.703	1.000	0.527	0.527	0.747	0.692	0.819
SE	0.621	0.703	0.824	0.747	0.665	0.863	0.731	0.291	0.527	1.000	0.824	0.516	0.714	0.736
SI	0.571	0.802	0.780	0.841	0.797	0.808	0.835	0.346	0.527	0.824	1.000	0.593	0.676	0.824
SK	0.346	0.764	0.615	0.786	0.731	0.637	0.742	0.330	0.747	0.516	0.593	1.000	0.549	0.747
UK	0.868	0.918	0.918	0.830	0.874	0.841	0.918	0.681	0.692	0.714	0.676	0.549	1.000	0.923

Source: EU-SILC 2009 cross-sectional data, Users' database - August 2011, authors' computations

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