

***The indicators of
intertemporal material
deprivation: a proposal
and an application to
EU countries***

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ABSTRACT

This paper analyses the effects of the inclusion of past experiences in measuring current material deprivation. The method followed generalises the recent proposal of Bossert, Chakravarty, Ceriani and D'Ambrosio (2013) by adapting the class of indices on the measurement of poverty over time of Dutta, Roope and Zank (2012). An application to the analysis of material deprivation within EU countries is then provided. Following the path of material deprivation experienced by each individual over time yields a picture which differs from that in the annual results. Since the measurement of material deprivation is used by the EU member states and the European Commission to monitor national and EU progress in the fight against poverty and social exclusion, the results suggest that time cannot be neglected. Countries should not only be compared based on their year-by-year results, but additional information is gained by following individuals over time and producing an aggregate measure once time is taken into account.

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1 Introduction

Material deprivation has been a key measure of individual well-being within the EU since 2010. In June of that year, the European Council adopted as part of the Europe 2020 Strategy the aim to lift at least 20 million people in the EU from the risk of poverty and exclusion by 2020. Material deprivation is a sub-indicator of this principal aim. The ‘Employment, Social Policy, Health and Consumer Affairs’ (EPSCO) EU Council of Ministers required improved measures of material deprivation for the mid-term review of the EU target. This paper aims to contribute in this direction by analysing the effects of the inclusion of past experiences in the measurement of current deprivation. The method followed generalises the recent proposal of Bossert, Chakravarty, Ceriani and D’Ambrosio (2013). It extends to the measurement of material deprivation the class of indices on the measurement of poverty over time in Dutta, Roope and Zank (2012). The indices are applied to analyse material deprivation within EU countries. If we follow the path of material deprivation experienced by each individual over time, we obtain a picture which differs from that in the annual results (although the three intertemporal indices do rank the countries very similarly). The short length of the panel, four years, is not sufficient to distinguish the different aspects of past experiences of material deprivation which are captured by the indices we apply here.

The theoretical work on which material deprivation measures are grounded comes from the literature on the measurement of poverty. From a theoretical point of view material deprivation is multidimensional poverty. The difference between the two concepts is due to the aspects of well-being which are included in the empirical analysis. In particular, a multidimensional poverty measure takes into consideration all the dimensions of well-being that may be of relevance (including non-material attributes, such as health status and political participation); on the contrary an index of material deprivation restricts attention to the functioning failures with respect to material living conditions. According to EU policy, indices of material deprivation are to be combined with income-based poverty measures and indicators of low employment.

The axiomatic literature has proposed many indices of multidimensional poverty and explored their underlying properties: see, for example, Chakravarty, Mukherjee and Ranade (1998), Tsui (2002), Bourguignon and Chakravarty (2003), Diez, Lasso de la Vega and Urrutia (2008), Alkire and Foster (2011) and Bossert, Chakravarty and D’Ambrosio (2013).

The intertemporal aspect of multidimensional poverty has received relatively little

attention to date. Most of the work in this literature has been atemporal. At the same time, many of the contributions in the field of unidimensional poverty have shown that chronic poverty and persistent periods of poverty are worse, in a number of ways, for individuals than are sporadic episodes. For surveys of this literature, see, among others, Rodgers and Rodgers (1993) and Jenkins (2000). These considerations have provided the impetus for some recent theoretical contributions on measuring income poverty over time, such as Calvo and Dercon (2009), Foster (2009), Hojman and Kast (2009), Hoy and Zheng (2011), Bossert, Chakravarty and D'Ambrosio (2012) and Dutta, Roope and Zank (2012). The *Journal of Economic Inequality* recently published a special issue on measuring poverty over time. I refer the reader to its introduction (Christiaensen and Shorrocks, 2012) for an exhaustive summary of the literature. See also Hoy, Thompson and Zheng (2012), Gradin, del Rio and Cantó (2012) and Mendola and Busetta (2012).

The indices proposed by Foster (2009), Bossert, Chakravarty and D'Ambrosio (2012) and Dutta, Roope and Zank (2012) share a similar structure and are generalizations of each other. Analysed together they allow different aspects of past experiences to be brought into the analysis of the phenomenon under consideration. The goal of the current paper is to propose an application of these latter contributions on the measurement of poverty over time to material deprivation using the EU-SILC panel data set, which includes information on different aspects of well-being over time.

The only other papers similar in spirit that I am aware of are Nicholas and Ray (2012) and Bossert, Chakravarty, Ceriani and D'Ambrosio (2013). The former propose generalizations of the contributions of Foster (2009) and Bossert, Chakravarty and D'Ambrosio (2012) and apply the resulting indices to the analysis of multidimensional deprivation in Australia during the 2001 to 2008 period. The second contribution extends the analysis to aspects of the past considered in Hojman and Kast (2009) in the measurement of material deprivation among EU countries using the same dataset as this paper but focussing on previous years. Hojman and Kast's (2009) index of poverty dynamics trades off poverty levels and changes (gains and losses) over time and is consistent with loss-aversion. The results in the second paper based on Hojman and Kast (2009) convey a different picture of material deprivation within EU countries and tend to favour countries in which individuals experience improvements in their material-deprivation scores. In this paper I aim to expand the analysis of intertemporal material deprivation with the inclusion of some mitigating effects of affluent periods, that is, of periods in which the individual is not deprived in any dimension. Section 2 provides the details. Below I propose a summary of the characteristics of the three measures.

The measures proposed by Foster (2009) are generalizations of the Foster-Greer-Thorbecke (1984) class and allow time to play a role. The individual-level Foster index is the arithmetic mean over time of the per-period Foster-Greer-Thorbecke indices. In a similar spirit, the corresponding individual intertemporal index of material deprivation applied in this paper is the average material deprivation experienced by the individual over time.

Bossert, Chakravarty and D'Ambrosio (2012) take persistence in the state of poverty into account. Their measure pays attention to the length of individual poverty spells by assigning a higher poverty weight to situations in which, *ceteris paribus*, poverty is experienced in consecutive rather than separated periods. The individual index is calculated as the weighted average of the individual per-period poverty values where, for each period, the weight is given by the length of the spell to which this period belongs. Similarly, the corresponding individual intertemporal index of material deprivation is calculated as the weighted average of the individual indices of material deprivation where, for each period, the weight is given by the length of the spell to which this period belongs.

Dutta, Roope and Zank (2012) generalizes Bossert, Chakravarty and D'Ambrosio (2012) to take into account not only the debilitating impact of persistence in the state of poverty but also the mitigating effect of periods of affluence on subsequent poverty. The class of proposed individual measures are a weighted sum over time of per-period Foster-Greer-Thorbecke indices where the weights reflect the damaging impact of consecutive periods in poverty and the mitigating effects of affluence periods. In a similar spirit, the corresponding individual intertemporal index of material deprivation is calculated as the weighted average of the individual indices of material deprivation.

In the multidimensional framework, each person is assigned a vector of several attributes that represent different dimensions of well-being. For the measurement of multidimensional poverty, it then becomes necessary to check whether a person has “minimally acceptable levels” of these attributes: see Sen (1992, p.139). These minimally-acceptable quantities of the attributes represent their threshold values or cut-offs that are necessary for an adequate standard of living. Therefore, a person is treated as deprived or poor in a dimension if the requisite observed level falls below this cut-off level. In this case it is said that the individual is experiencing a functioning failure. Material deprivation at the individual level is an increasing function of these failures.

The identification of the poor in a multivariate framework can be carried out using different methods. One way of considering a person as poor is if the individual experiences a functioning failure in every dimension; this identifies the poor as those who are poor in

all dimensions. This is known as the *intersection* method of identification of the poor. An alternative is the *union* method where the poor are identified as those experiencing at least one functioning failure. In between these two extremes lies the *intermediate* identification method, which regards a person as poor if she is deprived in at least $m \in \{1, \dots, M\}$ dimensions, where M is the number of dimensions on which human well-being is considered to depend. The approach to identification in the current paper follows the union method. Further analysis could be conducted adopting other identification strategies, for example focussing only on individuals severely materially deprived defined as those deprived for at least four items (see Eurostat, 2012).

The different dimensions of well-being are incorporated using what Atkinson (2003) refers to as the *counting* approach. The counting measure of individual poverty consists of the number of dimensions in which a person is poor, that is the number of the individual functioning failures. Since some of the dimensions may be more important than others, an alternative counting measure can be obtained by assigning different weights to different dimensions and then summing these weights for the dimensions in which functioning failure is observed. I follow both suggestions and produce results for two different weighting schemes: equal weights and Eurobarometer weights, where the latter reflect EU citizens' views on the importance of the dimension of well-being under consideration. For a discussion of weighting schemes in EU indicators, see Guio, Fusco and Marlier (2009). A survey on the use of weights in multidimensional indices of well-being can be found in Decancq and Lugo (2013).

The remainder of the paper proceeds as follows. Section 2 contains a description of the intertemporal indices of material deprivation. The application of these measures to illustrate the evolution of material deprivation in the European Union using the EU-SILC dataset appears in Section 3. Section 4 provides some brief concluding remarks.

2 Measuring material deprivation

Suppose there are $N \in \mathbb{N} \setminus \{1\}$ individuals in a society, $M \in \mathbb{N} \setminus \{1\}$ characteristics (or dimensions of material deprivation) and $T \in \mathbb{N} \setminus \{1\}$ time periods. For each individual $n \in \{1, \dots, N\}$, for each time period $t \in \{1, \dots, T\}$ and for each characteristic $m \in \{1, \dots, M\}$, we observe a binary variable $x_m^{nt} \in \{0, 1\}$. A value of one indicates that individual n is poor with respect to dimension m in period t , a value of zero identifies a characteristic with respect to which the individual is not poor in that period. For all $n \in \{1, \dots, N\}$ and for all $t \in \{1, \dots, T\}$, we let $x^{nt} = (x_1^{nt}, \dots, x_M^{nt}) \in \{0, 1\}^M$. For

all $n \in \{1, \dots, N\}$, we define the deprivation profile $x^n = (x^{n1}, \dots, x^{nT}) \in (\{0, 1\}^M)^T$. Furthermore, we let $x = (x^1, \dots, x^N) \in \left((\{0, 1\}^M)^T\right)^N$.

For each individual $n \in \{1, \dots, N\}$ and each time period $t \in \{1, \dots, T\}$, individual n 's material deprivation in t is given by

$$\sum_{m=1}^M x_m^{nt} \alpha_m$$

where $\alpha_m \in \mathbb{R}_{++}$ is a parameter assigned to dimension $m \in \{1, \dots, M\}$. In the applied part of the paper, I examine two different weighting schemes—one with identical weights for all dimensions, and another with weights that are derived from the Eurobarometer survey. See Section 3 for details.

A measure of intertemporal material deprivation for individual $n \in \{1, \dots, N\}$ is a function $D^n: (\{0, 1\}^M)^T \rightarrow \mathbb{R}_+$ which assigns a non-negative individual intertemporal material deprivation value to each x^n in its domain. A measure of aggregate intertemporal material deprivation is a function $D: \left((\{0, 1\}^M)^T\right)^N \rightarrow \mathbb{R}_+$ that assigns a non-negative intertemporal material deprivation value to each x in its domain.

The first approach analysed here is inspired by Foster (2009). For each individual n , intertemporal material deprivation F^n is the average material deprivation experienced throughout the T periods. That is, for all $x^n \in (\{0, 1\}^M)^T$,

$$F^n(x^n) = \frac{1}{T} \sum_{t=1}^T \sum_{m=1}^M x_m^{nt} \alpha_m.$$

Aggregate intertemporal material deprivation F is the arithmetic mean of the individual intertemporal material deprivation values. Thus, for all $x \in \left((\{0, 1\}^M)^T\right)^N$,

$$F(x) = \frac{1}{N} \sum_{n=1}^N F^n(x^n) = \frac{1}{N} \frac{1}{T} \sum_{i=1}^N \sum_{t=1}^T \sum_{m=1}^M x_m^{nt} \alpha_m.$$

In order to discuss the adaptation of Bossert, Chakravarty and D'Ambrosio's (2012) and Dutta, Roope and Zank's (2012) approaches to the intertemporal setting, some additional definitions are required.

Let $n \in \{1, \dots, N\}$ and $x^n \in (\{0, 1\}^M)^T$. We say that n is deprived in period $t \in \{1, \dots, T\}$ in x^n if and only if there exists $m \in \{1, \dots, M\}$ such that $x_m^{nt} = 1$. That is, in order to be deprived in period t in x^n , individual n must be deprived with respect to at least one dimension in this period. This corresponds to the union method of identifying

the deprived. Thus, individual n is not deprived in period t in x^n if and only if $x_m^{nt} = 0$ for all $m \in \{1, \dots, M\}$.

To capture the notion of persistence in a state of material deprivation, we introduce functions $P^{nt}: (\{0, 1\}^M)^T \rightarrow \{1, \dots, T\}$ for each $n \in \{1, \dots, N\}$ and for each $t \in \{1, \dots, T\}$. If n is deprived in period t in x^n , we let $P^{nt}(x^n)$ be the maximal number of consecutive periods including t in which n is deprived. Analogously, if n is not deprived in period t in x^n , $P^{nt}(x^n)$ is the maximal number of consecutive periods including t in which n is not deprived. To illustrate this definition, suppose $T = 7$ and x^n is such that n is deprived in periods one, four, five, and seven. The length of the first spell of material deprivation is one and, thus, $P^{n1}(x^n) = 1$. This is followed by a spell out of deprivation of length two (in periods two and three), which implies $P^{n2}(x^n) = P^{n3}(x^n) = 2$. The next two periods are periods with deprivation and we obtain $P^{n4}(x^n) = P^{n5}(x^n) = 2$. Period six is a single period without deprivation and, thus, $P^{n6}(x^n) = 1$. Finally, there is a one-period spell of material deprivation and we have $P^{n7}(x^n) = 1$.

For a deprivation profile x^n let s_t be the number of consecutive non-deprived periods immediately prior to a deprived period t , and let k_t be the number of preceding periods of uninterrupted positive levels of deprivation, up to and including the deprived period t . Formally,

$$s_t = \begin{cases} 0 & \text{if } t = 1 \text{ or } x^{n(t-1)} > 0 \\ t - \min\{s \mid s < t \text{ and } x^{ns} = \dots = x^{n(t-1)} = 0\} & \text{otherwise.} \end{cases}$$

and

$$k_t = \begin{cases} 1 & \text{if } t = 1 \text{ or } x^{n(t-1)} = 0 \\ t - \min\{s - 1 \mid s < t \text{ and } x^{nt'} > 0, \forall t' = s, \dots, t\} & \text{otherwise.} \end{cases}$$

For example, for $T = 4$, the deprivation profile $x^n = (x^{n1}, 0, x^{n3}, x^{n4})$ has $s_1=0$, $k_1=1$, $s_3=1$ and $k_3=1$, and $s_4=0$ and $k_4=2$.

Following Bossert, Chakravarty and D'Ambrosio (2012), intertemporal material deprivation BCD^n for individual $n \in \{1, \dots, N\}$ is a weighted mean of the individual material deprivation values where, for each period, the weight is given by the length of the spell to which this period, t , belongs, $P^{nt}(x^n)$. Thus, according to this approach, individual intertemporal material deprivation BCD^n is given by

$$BCD^n(x^n) = \frac{1}{T} \sum_{t=1}^T P^{nt}(x^n) \sum_{m=1}^M x_m^{nt} \alpha_m$$

for all $x^n \in (\{0, 1\}^M)^T$. Again, aggregate intertemporal material deprivation BCD is the arithmetic mean of the individual intertemporal material deprivation values. Thus, for all $x \in \left((\{0, 1\}^M)^T\right)^N$,

$$BCD(x) = \frac{1}{N} \sum_{n=1}^N BCD^n(x^n) = \frac{1}{N} \frac{1}{T} \sum_{i=1}^N \sum_{t=1}^T P^{nt}(x^n) \sum_{m=1}^M x_m^{nt} \alpha_m.$$

Dutta, Roope and Zank (2012) propose to include the debilitating impact of persistence in the state of poverty and the mitigating effect of periods of affluence on subsequent poverty. Their individual measure DRZ^n is a weighted mean of the individual material deprivation values where, for each period, the weight considers the number of preceding periods of uninterrupted positive levels of deprivation, up to and including the deprived period t (see also BCD^n for an alternative weighing scheme) and the number of consecutive non-poor periods immediately prior to a poor period, s_t . Thus, according to this approach, individual intertemporal material deprivation DRZ^n is given by

$$DRZ^n(x^n) = \frac{1}{T} \sum_{t=1}^T \frac{k_t}{1 + s_t} \sum_{m=1}^M x_m^{nt} \alpha_m$$

for all $x^n \in (\{0, 1\}^M)^T$. Again, aggregate intertemporal material deprivation DRZ is the arithmetic mean of the individual intertemporal material deprivation values. Thus, for all $x \in \left((\{0, 1\}^M)^T\right)^N$,

$$DRZ(x) = \frac{1}{N} \sum_{n=1}^N DRZ^n(x^n) = \frac{1}{N} \frac{1}{T} \sum_{i=1}^N \sum_{t=1}^T \frac{k_t}{1 + s_t} \sum_{m=1}^M x_m^{nt} \alpha_m.$$

Following Gradin, del Rio and Cantó (2012), generalized versions of the indices above could be computed by applying a general mean in the second aggregation stage as opposed to the arithmetic mean. This will reflect the extent of aversion to inequality of intertemporal material deprivation across individuals. I leave this extension to future research.

3 Data and results

In this section, I apply the indices defined above to measure material deprivation over time in the EU. The dataset I use is EU-SILC, which is employed by European Union member states and the Commission to monitor national and EU progress towards key objectives

for the social inclusion process and the Europe 2020 growth strategy. I use to the latest version of the data which include one of the double-dip recession years such as 2010, EUSILC LONGITUDINAL UDB 2010 version-2 of March 2013. My analysis covers only the years from 2007 to 2010 and, since I am interested in intertemporal material deprivation, I focus only on the longitudinal component of the dataset. To maximize the horizon of observation I restrict the sample to households who have been interviewed for four years. The peculiarity of the sample used in this paper may give rise to differences between results obtained based on the entire sample. The variables that may be used in the measurement of material deprivation are available mainly at the household level. I follow a conservative approach in the sense that I treat the households reporting a missing value in the same way as those reporting not experiencing the functioning failure. As a result, I may be underestimating material deprivation, since I am attributing a functioning failure exclusively to households who explicitly claim to have the failure. The unit of analysis is the individual, that is the household failure is attributed to each household member, and I analyse the distribution of functioning failures among individuals.

The variables at the basis of the measures of material deprivation are listed in Table 1.

[Table 1 here]

These variables are grouped according to three domains of quality of life: financial difficulties, housing conditions and durables, for a total of twelve indicators. These are the same variables chosen by Fusco, Guio and Marlier (2010). For other EU studies on material deprivation on different dimensions of well-being see, amongst others, Guio (2009) and Guio, Fusco and Marlier (2009). Different dimensions of material deprivation could be applied in future work focussing exclusively on economic strain variables and excluding durable goods which are found to be more stable over time.

I use two weighting schemes: identical weights for all dimensions and weights that are constructed from the views of EU citizens as surveyed in 2007 in the special Eurobarometer 279 on poverty and social exclusion (see TNS Opinion & Social, 2007). This weighting method was first proposed by Guio, Fusco and Marlier (2009). For each variable, with this weighting scheme, I use as the weight the percentage of the EU27 citizens answering “absolutely necessary, no one should have to do without” to the requisite question as expressed by these instructions: “In the following questions, we would like to understand better what, in your view, is necessary for people to have what can be considered as an acceptable or decent standard of living in (OUR COUNTRY). For a person to have a

decent standard of living in (OUR COUNTRY), please tell me how necessary do you think it is ... (if one wants to)." The possible answers also included "necessary," "desirable but not necessary" and "not at all necessary." See Table 2 for the relevant percentages.

The results of the intertemporal indices are reported in Tables 3 and 4 for the two weighting schemes. Each table includes the value of the index and the rankings of the countries (where 1 indicates the country with minimum deprivation). Figures 1 and 2 plot for easy visual inspection, for each weighting scheme, the rankings of the intertemporal material deprivation indices. The countries are ordered according to the values of the Foster index. As a benchmark, I also compute the indices of material deprivation for each year. These are contained in Table 5 (results with equal weights) and Table 6 (results with Eurobarometer weights), and the ranks are plotted in Figures 3 and 4 respectively. Figures 5 and 6 compare the rankings of the countries resulting from the three intertemporal indices with those of yearly material deprivation in 2009 used as a benchmark for the two weighting schemes. Material deprivation over time is also compared with standard income poverty results based on the headcount index. The adopted income poverty line is set to 60% of the national median of the distribution of yearly equivalized household income using the OECD modified equivalence scale in order to account for different household size and composition. A note of caution is necessary with the analysis of income poverty: the results may differ from those obtained with the same dataset due to the restriction of the sample adopted in this paper.

The three intertemporal indices rank the countries very similarly: see Figures 1 and 2 and Tables 3 and 4. The short length of the panel, only four years, is not sufficient to distinguish the different aspects of past experiences of material deprivation. For both weighting schemes the least-deprived country is Sweden followed by Luxembourg and the Netherlands. Finland and the UK swap position when material deprivation over time takes into consideration persistency in the state as opposed to an average value. At the opposite end of the rankings are Bulgaria, Hungary and Latvia. The order among relatively highly deprived countries such as Cyprus, Lithuania, Poland and Portugal depends on the weighting scheme and index used.

[Figures 1 and 2 and Tables 3 and 4 here]

As clearly depicted in Figures 1 and 2, the rankings of the countries change only little when the different intertemporal considerations are included.

When time is not taken into consideration, in all the years analysed (but in 2010) and for both weighting schemes, the Netherlands is the least-deprived country, followed

by Sweden, Luxembourg and Finland. See Figures 3 and 4 and Tables 5 and 6. At the other end of the rankings, the worst position with respect to yearly material deprivation is occupied by Bulgaria, for both weighting schemes. Many relevant changes occur during the years starting from the fifth position onwards especially when Eurobarometer weights are applied.

[Figures 3 and 4 and Tables 5 and 6 here]

When time is taken into account, the picture that emerges is different. Figures 5 and 6 compare the rankings of the countries with the yearly values for 2010. According to intertemporal material deprivation the ranking of the least deprived countries is for both weighting schemes: Sweden, Luxembourg and the Netherlands. Focussing only on 2010 the country with the best performance in 2010 is Sweden for the situation of equal weights and the Netherlands for Eurobarometer weights. This indicates that the materially-deprived Swedes enjoy more affluent periods and are less persistently-deprived than are the corresponding Dutch. Spain improves by two positions when intertemporal material deprivation is measured and by one position for Eurobarometer weights according to the Foster and BCD indices. For some other countries we observe a movement of one position in both directions. The Netherlands, Italy and Poland are the countries whose position is the most deteriorated when intertemporal considerations are included but this results differ depending on the weighting schemes and the index.

Figures 7 to 10 and Table 7 contain results for intertemporal material deprivation and income poverty. In the first two figures I compare the ranking of the countries with poverty during the last year of analysis, while the comparisons with poverty in 2007 are plotted in Figures 9 and 10. As obvious intertemporal material deprivation is not related to income poverty in any of the two years. As recommended by EU policy makers, indices of material deprivation are to be combined with income-based poverty measures since the two captures different aspects of individual well-being.

4 Concluding remarks

In this paper I analyse the role of intertemporal considerations in material deprivation and compare EU countries according to this additional information. If we follow the path of material deprivation experienced by each individual over time we obtain a different picture from that given by the yearly results. The contribution of this paper is more

methodological and of guidance for fully empirically focussed analysis of material deprivation. Further analysis could extend the results to patterns of deprivation by population subgroups to better understand the risk factors generating deprivation. Since the measurement of material deprivation is used by the EU member states and the European Commission to monitor national and EU progress in the fight against poverty and social exclusion, the basic results reported here suggest that time cannot be neglected. Countries should not only be compared according to their yearly results but also when we follow individuals over time in order to produce a time-sensitive aggregate measure of material deprivation. Intertemporal material deprivation indices could be thought of as indicators of extreme forms of poverty along the lines of the recommendations of the Indicators Sub Group of the Social Protection Committee (see Bradshaw and Mayhew, 2011).

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TABLE 1: MATERIAL DEPRIVATION VARIABLES

<i>Financial difficulties</i>	
1.	Has been in arrears at any time in the last 12 months on: - mortgage or rent payments (hs010) - utility bills (hs020) - hire-purchase installments or other loan payments (hs030) Cannot afford paying for one week annual holiday away from home (hs040)
2.	Cannot afford a meal with meat, chicken, fish (or vegetarian equivalent) every other day (hs050)
3.	Lacks the capacity to face unexpected required expenses (hs060)
<i>Durables</i>	
5.	Cannot afford a telephone (including mobile phone) (hs070)
6.	Cannot afford a colour tv (hs080)
7.	Cannot afford a computer (hs090)
8.	Cannot afford a washing machine (hs100)
9.	Cannot afford to have a car (hs110)
10.	Lacks the ability to keep the home adequately warm (hh050)
<i>Housing Conditions</i>	

Source: EU-SILC dataset

N.B. For a selected number of countries in years 2007, 2008 and 2009, variables hs010, hs020 and hs030 have been replaced by new variables labeled hs011, hs021 and hs031 respectively. The two sets of variables measure the same dimensions. While hs010, hs020 and hs030 are binary variables (1=yes, 2=no), variable hs011, hs021 and hs031 take on three values (1=yes, once; 2=yes, two or more times; 3=no). We recode hs011, hs021 and hs031 as binary and use them in the place of hs010, hs020 and hs030.

TABLE 2: ANSWERS IN PERCENTAGES TO: “IN THE FOLLOWING QUESTIONS, WE WOULD LIKE TO UNDERSTAND BETTER WHAT, IN YOUR VIEW, IS NECESSARY FOR PEOPLE TO HAVE WHAT CAN BE CONSIDERED AS AN ACCEPTABLE OR DECENT STANDARD OF LIVING IN (OUR COUNTRY). FOR A PERSON TO HAVE A DECENT STANDARD OF LIVING IN (OUR COUNTRY), PLEASE TELL ME HOW NECESSARY DO YOU THINK IT IS...(IF ONE WANTS TO)”.

EU27	Absolutely necessary, no one should have to do without	Necessary	Desirable but not necessary	Not at all necessary
A place to live without a leaking roof, damp walls, floors, foundation	68%	28%	3%	1%
To be able to keep one's home adequately warm	62%	35%	3%	0%
A place to live with its own bath or shower	63%	31%	6%	0%
An indoor flushing toilet for sole use of the household	69%	27%	4%	0%
To be able to pay rent or mortgage payments on time	62%	34%	3%	0%
To be able to pay utility bills (electricity, water, gas, etc.) on time	68%	30%	2%	0%
To be able to repay loans (such as loans to buy electrical appliances, furniture, a car or student loans, etc.) on time	48%	40%	9%	2%
Paying for one week annual holiday away from home	15%	29%	43%	13%
A meal with meat, chicken or fish at least once every two days	43%	37%	17%	3%
To be able to cope with an unexpected financial expense of X (NATIONAL CURRENCY)	32%	43%	21%	2%
A fixed telephone, landline	18%	37%	32%	13%
A mobile phone	12%	26%	37%	25%
A colour TV	19%	36%	35%	10%
A computer	9%	21%	41%	28%
A washing machine	48%	41%	10%	1%
A car	17%	34%	36%	13%
A place to live without too much noise from neighbours or noise from the street (traffic, businesses, factories, etc.)	28%	43%	27%	2%
A place to live without too much pollution or other environmental problems (such as air pollution, grime or rubbish)	42%	44%	13%	1%
A place to live without crime, violence or vandalism in the area	49%	38%	12%	1%

TABLE 3: INTERTEMPORAL MATERIAL DEPRIVATION AND RANKING OF EU MEMBER STATES IN THE YEARS 2007-2010 WITH UNITARY WEIGHTS.

Country	Foster	rank Foster	DRZ	rank DRZ	BCD	rank BCD
AT	0.877	7	1.816	7	1.866	7
BE	0.792	6	1.689	6	1.733	6
BG	3.394	20	8.056	20	8.092	20
CY	1.665	14	3.519	13	3.610	13
CZ	1.092	9	2.381	9	2.439	9
EE	1.318	12	2.843	12	2.925	12
ES	0.921	8	1.897	8	1.971	8
FI	0.655	4	1.401	5	1.438	5
HU	2.339	19	5.581	19	5.619	19
IT	1.111	11	2.404	11	2.459	10
LT	1.885	16	4.257	16	4.335	16
LU	0.368	2	0.730	2	0.763	2
LV	2.203	18	5.049	18	5.132	18
NL	0.495	3	1.029	3	1.062	3
PL	1.943	17	4.506	17	4.537	17
PT	1.666	15	3.803	15	3.845	15
SE	0.341	1	0.623	1	0.658	1
SI	1.103	10	2.404	10	2.476	11
SK	1.661	13	3.673	14	3.730	14
UK	0.656	5	1.305	4	1.363	4

TABLE 4: INTERTEMPORAL MATERIAL DEPRIVATION AND THE RANKING OF EU MEMBER STATES IN THE YEARS 2007-2010 WITH EUROBAROMETER WEIGHTS.

Country	Foster EU	rank Foster EU	DRZ EU	rank DRZ EU	BCD EU	rank BCD EU
AT	0.490	7	1.070	7	1.101	7
BE	0.506	6	1.055	6	1.082	6
BG	2.966	20	6.772	20	6.804	20
CY	1.253	17	3.030	16	3.108	16
CZ	0.668	8	1.277	9	1.307	8
EE	0.906	12	2.090	12	2.151	12
ES	0.612	9	1.277	8	1.324	9
FI	0.441	4	0.883	5	0.906	5
HU	1.658	19	4.012	19	4.040	19
IT	0.676	10	1.591	10	1.626	10
LT	1.378	15	3.025	15	3.079	15
LU	0.231	2	0.449	2	0.470	2
LV	1.761	18	3.731	18	3.791	18
NL	0.229	3	0.528	3	0.545	3
PL	1.569	16	3.162	17	3.184	17
PT	1.189	14	2.837	14	2.867	14
SE	0.231	1	0.372	1	0.394	1
SI	0.763	11	1.669	11	1.719	11
SK	1.384	13	2.692	13	2.735	13
UK	0.431	5	0.819	4	0.856	4

TABLE 5: YEARLY MATERIAL DEPRIVATION AND RANKING OF EU MEMBER STATES IN THE YEARS 2007-2010 WITH UNITARY WEIGHTS.

Country	I2007	rank 2007	I2008	rank 2008	I2009	rank 2009	I2010	rank 2010
AT	0.962	7	1.062	8	0.854	6	0.778	6
BE	0.906	6	0.895	6	0.859	7	0.782	7
BG	4.431	20	3.648	20	4.167	20	4.301	20
CY	2.287	16	1.633	13	1.754	14	1.830	15
CZ	1.187	9	1.184	10	1.240	9	1.200	8
EE	1.331	11	1.166	9	1.458	12	1.705	12
ES	1.134	8	1.026	7	1.222	8	1.248	10
FI	0.648	4	0.650	4	0.636	4	0.577	4
HU	2.557	18	2.480	19	2.675	18	2.657	18
IT	1.348	12	1.292	11	1.244	10	1.236	9
LT	2.063	15	1.899	16	1.981	16	2.362	17
LU	0.592	3	0.593	3	0.558	3	0.480	3
LV	2.636	19	2.478	18	2.815	19	3.104	19
NL	0.458	1	0.414	1	0.385	1	0.393	2
PL	2.484	17	2.179	17	2.109	17	2.069	16
PT	1.860	13	1.821	15	1.727	13	1.726	14
SE	0.479	2	0.461	2	0.423	2	0.337	1
SI	1.280	10	1.409	12	1.387	11	1.422	11
SK	2.009	14	1.789	14	1.844	15	1.710	13
UK	0.733	5	0.759	5	0.839	5	0.768	5

TABLE 6: YEARLY MATERIAL DEPRIVATION AND RANKING OF EU MEMBER STATES IN THE YEARS 2007-2010 WITH EUROBAROMETER WEIGHTS.

Country	I_Eu2007	rank_Eu2007	I_Eu2008	rank_Eu2008	I_Eu2009	rank_Eu2009	I_Eu2010	rank_Eu2010
AT	0.572	6	0.664	8	0.547	7	0.503	7
BE	0.601	7	0.578	6	0.545	5	0.500	6
BG	3.670	20	3.080	20	3.590	20	3.734	20
CY	1.996	19	1.407	16	1.541	17	1.619	16
CZ	0.669	8	0.648	7	0.695	8	0.668	8
EE	0.954	12	0.859	10	1.106	12	1.320	14
ES	0.780	9	0.705	9	0.869	9	0.895	10
FI	0.422	4	0.436	4	0.433	4	0.397	4
HU	1.848	17	1.815	18	1.985	18	2.005	18
IT	0.944	11	0.904	11	0.871	10	0.868	9
LT	1.468	14	1.336	14	1.482	15	1.703	17
LU	0.381	3	0.367	3	0.354	3	0.300	3
LV	1.925	18	1.852	19	2.140	19	2.409	19
NL	0.251	1	0.220	1	0.206	1	0.210	1
PL	1.803	16	1.544	17	1.518	16	1.498	15
PT	1.402	13	1.364	15	1.303	13	1.302	13
SE	0.293	2	0.301	2	0.273	2	0.219	2
SI	0.909	10	1.014	12	1.012	11	1.043	11
SK	1.487	15	1.311	13	1.385	14	1.278	12
UK	0.471	5	0.485	5	0.545	6	0.494	5

TABLE 7: YEARLY INCOME POVERTY AND RANKING OF EU MEMBER STATES IN THE YEARS 2007-2010.

Country	P_2007	Rank_2007	P_2008	rank_2008	P_2009	rank_2009	P_2010	rank_2010
AT	0.134	9	0.117	6	0.117	8	0.112	7
BE	0.153	10	0.141	10	0.150	10	0.120	9
BG	0.225	20	0.212	18	0.233	19	0.223	20
CY	0.175	12	0.172	12	0.155	12	0.180	16
CZ	0.084	3	0.091	3	0.071	1	0.080	1
EE	0.220	19	0.219	19	0.197	18	0.132	10
ES	0.174	11	0.175	13	0.171	14	0.194	19
FI	0.117	7	0.140	9	0.137	9	0.134	11
HU	0.114	6	0.096	5	0.086	3	0.100	3
IT	0.200	16	0.197	16	0.185	16	0.182	17
LT	0.198	15	0.198	17	0.191	17	0.155	12
LU	0.120	8	0.118	7	0.107	6	0.094	2
LV	0.213	18	0.270	20	0.240	20	0.184	18
NL	0.083	2	0.092	4	0.114	7	0.102	4
PL	0.178	13	0.178	14	0.163	13	0.160	13
PT	0.212	17	0.183	15	0.179	15	0.175	15
SE	0.070	1	0.089	2	0.102	4	0.111	6
SI	0.113	5	0.120	8	0.102	5	0.106	5
SK	0.088	4	0.088	1	0.082	2	0.113	8
UK	0.181	14	0.170	11	0.152	11	0.163	14

FIGURE 1: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH UNITARY WEIGHTS.

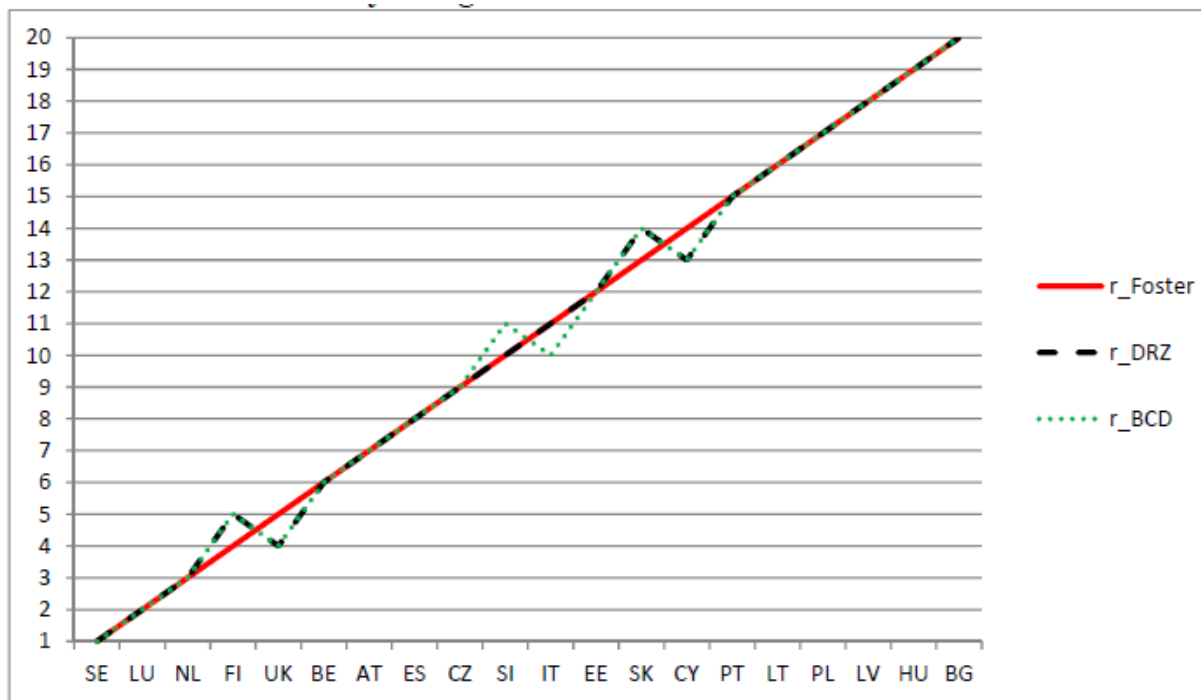


FIGURE 2: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH EUROBAROMETER WEIGHTS.

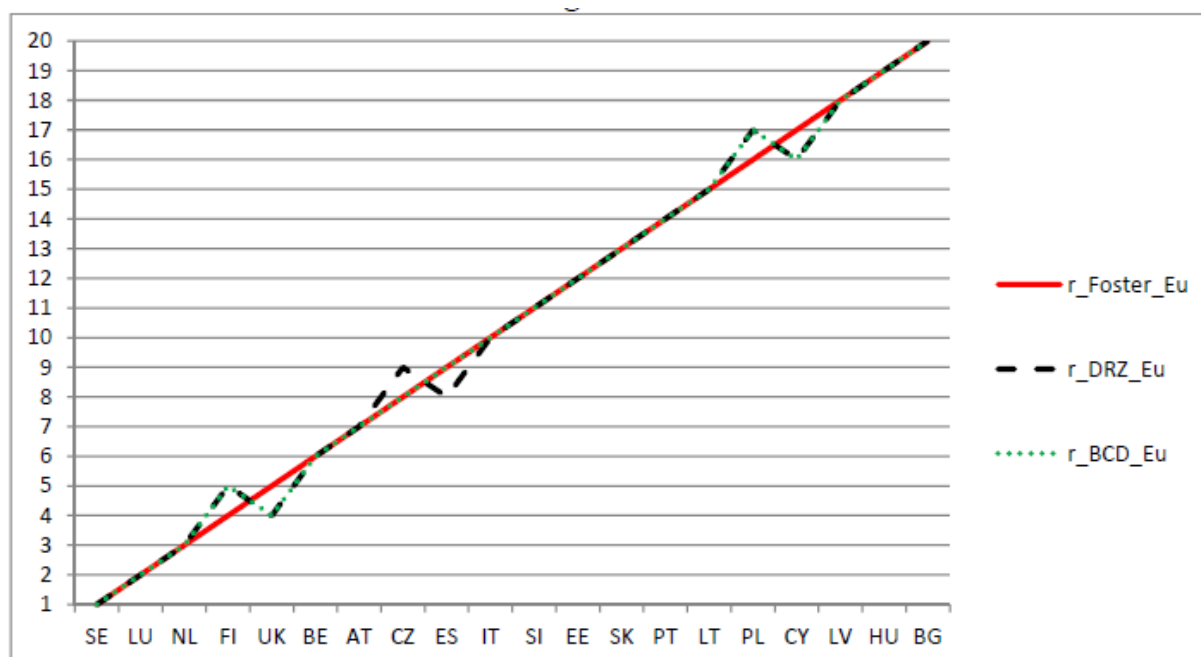


FIGURE 3: CHANGES IN THE RANKING OF YEARLY MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH UNITARY WEIGHTS.

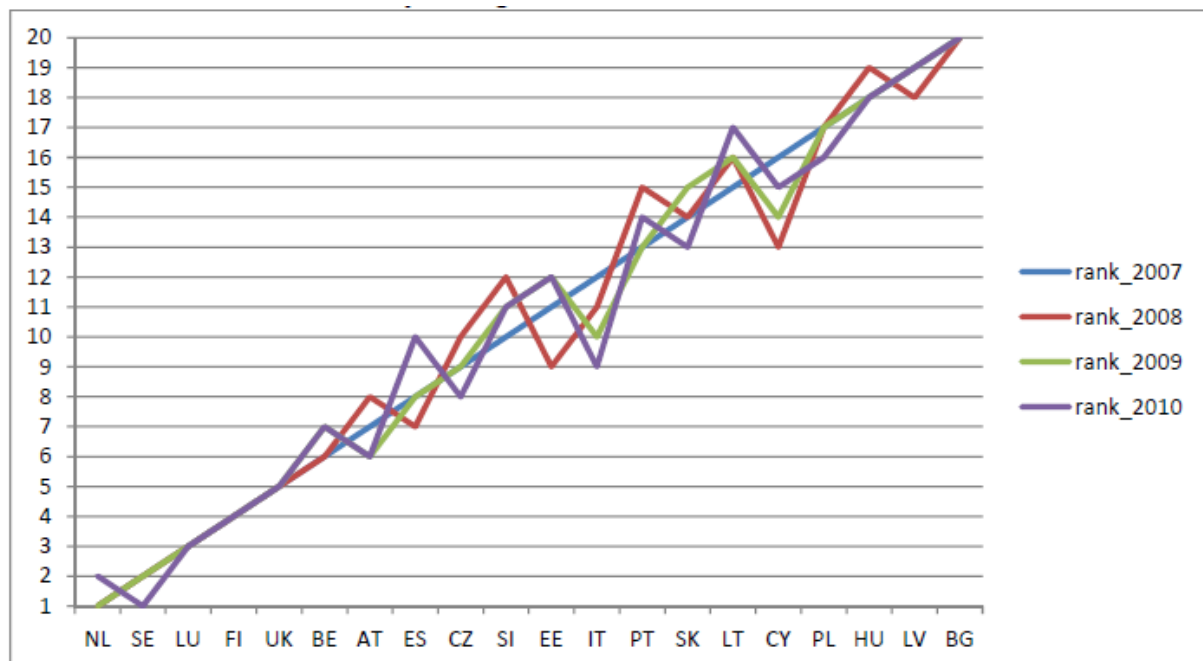


FIGURE 4: CHANGES IN THE RANKING OF YEARLY MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH EUROBAROMETER WEIGHTS.

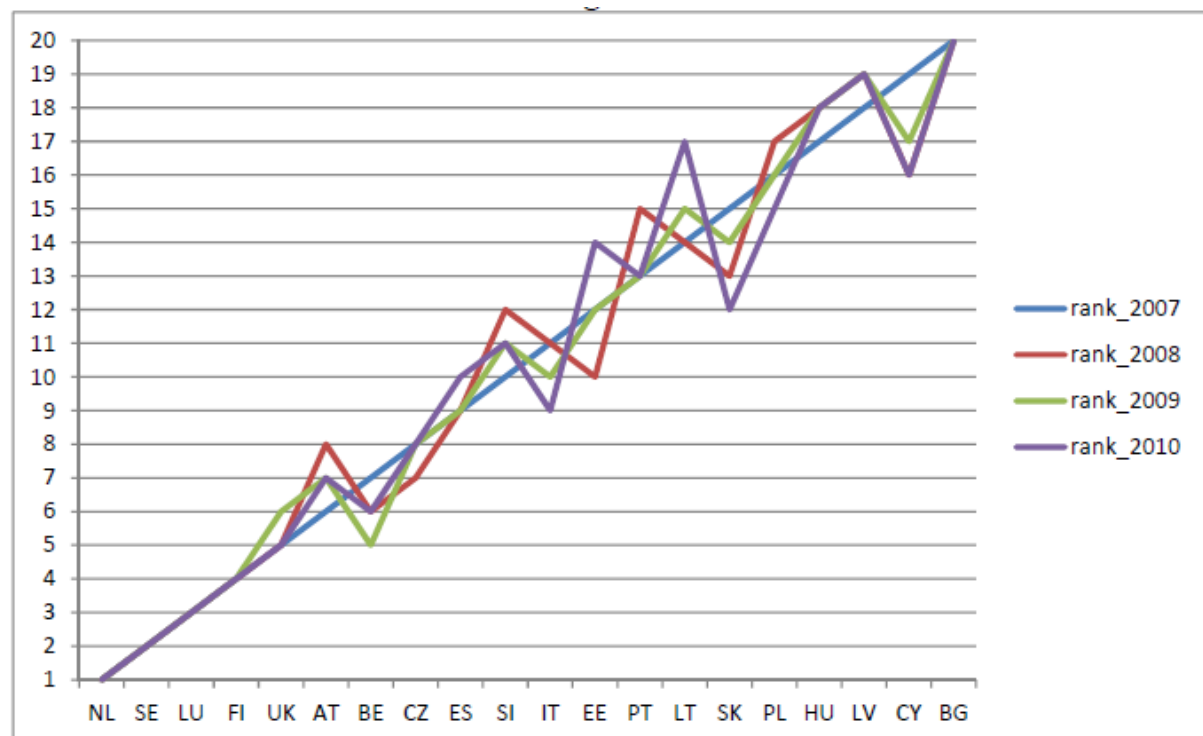


FIGURE 5: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH UNITARY WEIGHTS VERSUS THE RANKS OF YEARLY MATERIAL DEPRIVATION IN 2010.

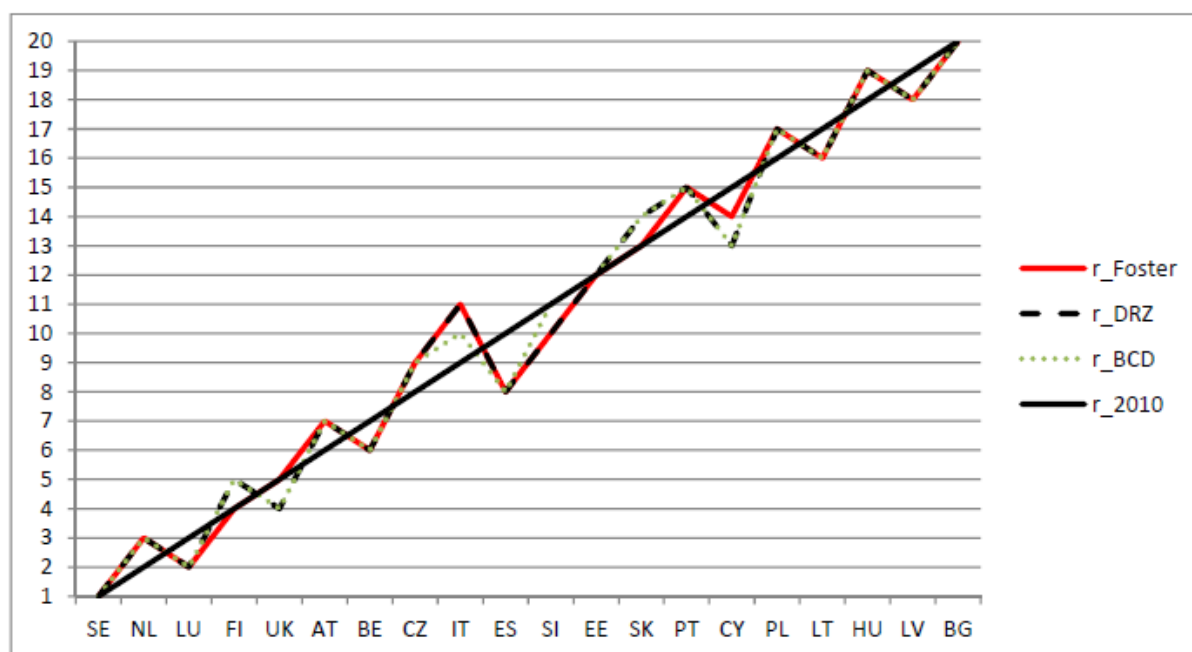


FIGURE 6: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH EUROBAROMETER WEIGHTS VERSUS THE RANKING OF YEARLY MATERIAL DEPRIVATION IN 2010.

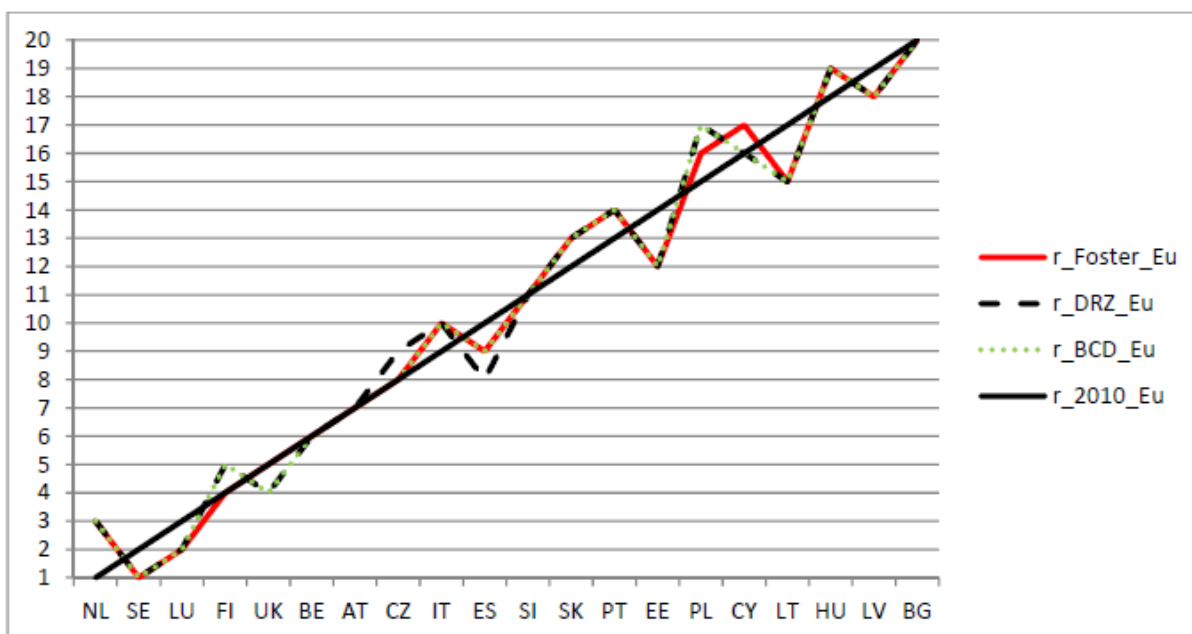


FIGURE 7: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH UNITARY WEIGHTS VERSUS THE RANKS OF YEARLY INCOME POVERTY IN 2010.

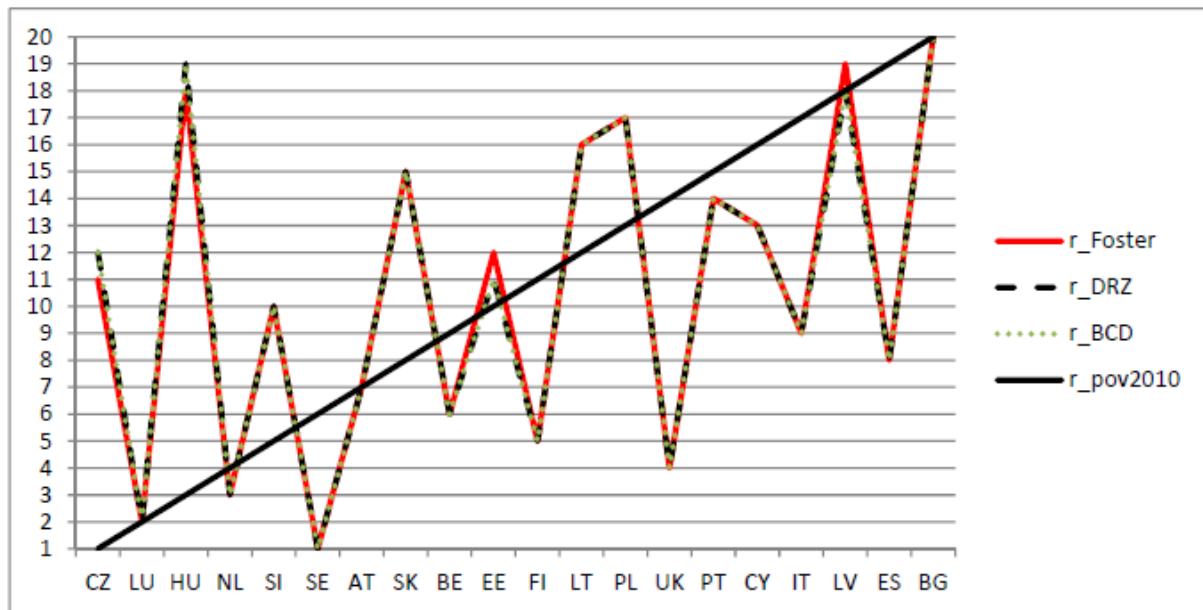


FIGURE 8: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH EUROBAROMETER WEIGHTS VERSUS THE RANKING OF YEARLY INCOME POVERTY IN 2010.

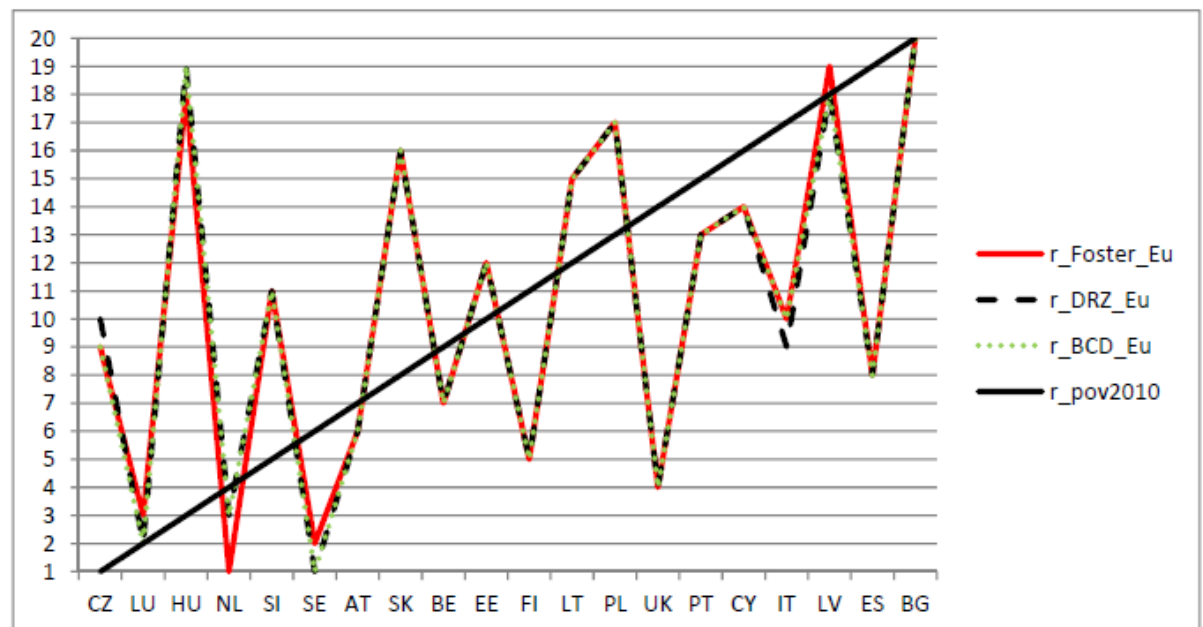


FIGURE 9: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH UNITARY WEIGHTS VERSUS THE RANKS OF YEARLY INCOME POVERTY IN 2007.

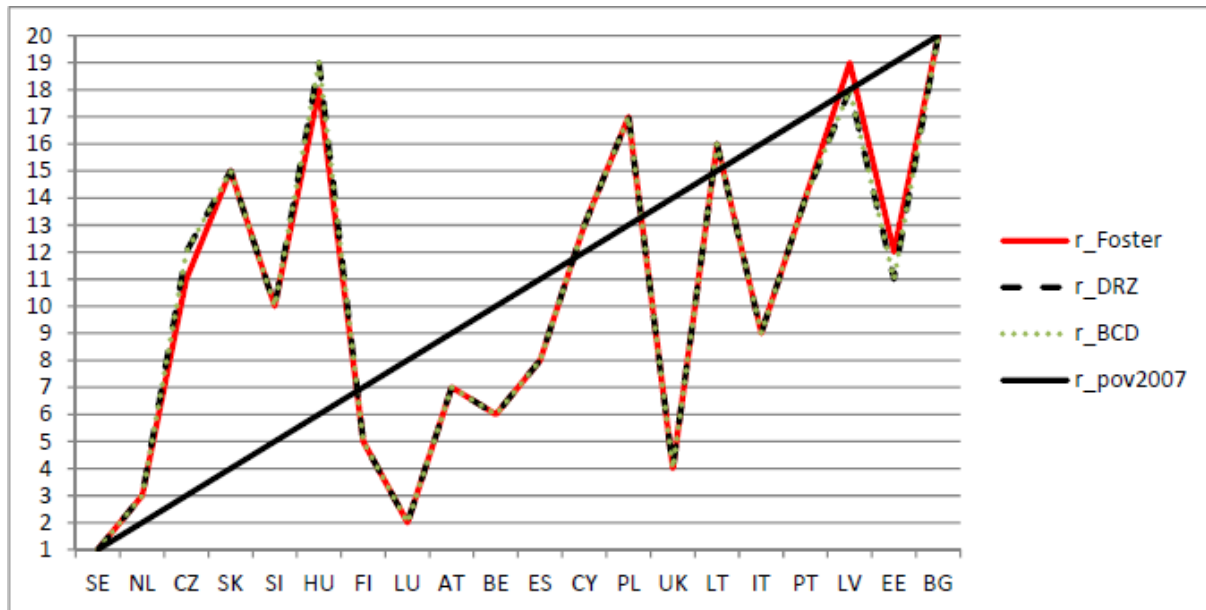
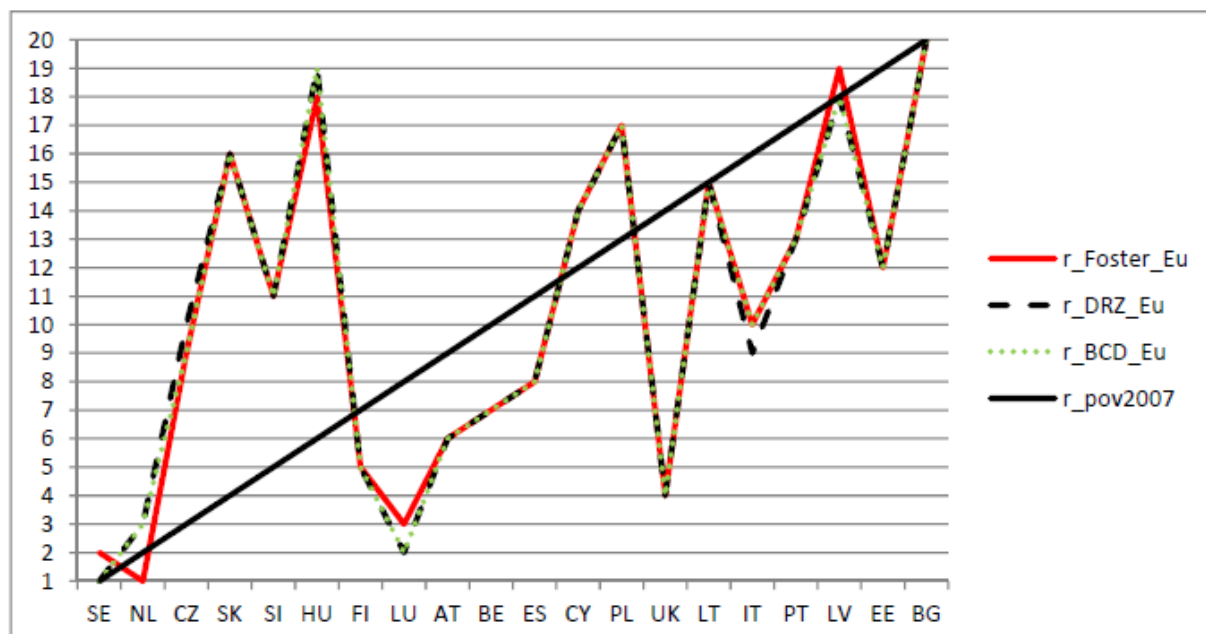


FIGURE 10: CHANGES IN THE RANKING OF INTERTEMPORAL MATERIAL DEPRIVATION AMONG EU MEMBER STATES WITH EUROBAROMETER WEIGHTS VERSUS THE RANKING OF YEARLY INCOME POVERTY IN 2007.



ImProvE: Poverty Reduction in Europe. Social Policy and Innovation

Poverty Reduction in Europe: Social Policy and Innovation (ImPRovE) is an international research project that brings together ten outstanding research institutes and a broad network of researchers in a concerted effort to study poverty, social policy and social innovation in Europe. The ImPRovE project aims to improve the basis for evidence-based policy making in Europe, both in the short and in the long term. In the short term, this is done by carrying out research that is directly relevant for policymakers. At the same time however, ImPRovE invests in improving the long-term capacity for evidence-based policy making by upgrading the available research infrastructure, by combining both applied and fundamental research, and by optimising the information flow of research results to relevant policy makers and the civil society at large.

The two central questions driving the ImPRovE project are:

How can social cohesion be achieved in Europe?

How can social innovation complement, reinforce and modify macro-level policies and vice versa?

The project runs from March 2012 till February 2016 and receives EU research support to the amount of Euro 2.7 million under the 7th Framework Programme. The output of ImPRovE will include over 55 research papers, about 16 policy briefs and at least 3 scientific books. The ImPRovE Consortium will organise two international conferences (Spring 2014 and Winter 2015). In addition, ImPRovE will develop a new database of local projects of social innovation in Europe, cross-national comparable reference budgets for 6 countries (Belgium, Finland, Greece, Hungary, Italy and Spain) and will strongly expand the available policy scenarios in the European microsimulation model EUROMOD.

More detailed information is available on the website <http://improve-research.eu>.

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