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DEPRIVATION AND SUBJECTIVE WELL-BEING: EVIDENCE FROM PANEL DATA

by Maite Blázquez Cuesta*

Universidad Autónoma de Madrid

and

Santiago Budría

CEEAplA and IZA

This paper uses data from the 2000–08 waves of the German Socio-Economic Panel dataset (SOEP) to assess the impact of deprivation in various life domains upon individual well-being. Unobserved heterogeneity is controlled for by means of a random effects model extended to include a Mundlak term and explicit controls for the respondents' personality traits. The paper shows that people care about social comparison information in a number of domains, not just income. Using an equivalent income approach, the estimates suggest that a one standard deviation deterioration of the individual position in the income distribution is as important as a 33.5 percent decrease in own income. This monetary equivalent amounts to an income variation of between 25 and 43 percent when it comes to other deprivation domains, including durables, accommodation, health, and social relations. These results recommend that in the fight against deprivation more emphasis should be directed to these non-monetary relevant dimensions.

JEL Codes: D63, I31

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1. Introduction

> A house may be large or small; as long as the neighboring houses are likewise small, it satisfies all social requirement for a residence. But let there arise next to the little house a palace, and the little house shrinks to a hut. . . . and however high it may shoot up in the course of civilization, if the neighboring palace rises in equal or even in greater measure, the occupant of the relatively little house will always find himself more uncomfortable, more dissatisfied, more cramped within his four walls. (Karl Marx, *Wage-Labor and Capital*, 1847)

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*Correspondence to: Maite Blázquez, Department of Economic Analysis, Universidad Autónoma de Madrid, Cantoblanco, 28049 Madrid, Spain (maite.blazquez@uam.es).

With the Laeken European Council in December 2001 it was established that, apart from income, other indicators of the quality of life of an individual are necessary to evaluate the well-being of citizens. To distinguish these multidimensional indicators from pure income poverty measures, the concepts of material deprivation and social exclusion were proposed. The increasing importance of these phenomena has been reflected at the European level by the "National Action Plans for Social Inclusion." This program aims at progressively reducing social inequalities and preventing social exclusion (the Europe 2020 Strategy) and reflects the current need for a multidimensional approach to study social disadvantage.

This paper uses data from the 2000–08 waves of the German Socio-Economic Panel dataset (SOEP) to investigate the impact of deprivation in various life domains on individual well-being. This variable is subjectively assessed and can be regarded as a proxy for individual utility. Although there is still no agreed definition either of the phenomenon of deprivation itself or of its main causes, some consensus has been achieved about the most fundamental elements of it. Deprivation refers to an individual's lack of command over specific functionings and is multidimensional inasmuch it involves a variety of life domains. It is also a relative concept in that it involves comparison processes.

Advancements in the measurement of deprivation and in the analysis of its consequences have been mostly at the aggregate level, with European member states regularly reporting a set of commonly defined indicators agreed by the European Council.[1] Somewhat surprisingly, studies at the micro level evaluating the consequences of deprivation upon subjective well-being (SWB) among the population are scarce. Most evidence at the micro level revolves around the income–SWB relationship, with the general finding that relative income, as measured by either the mean income of the reference group or the individual ordinal ranking within the group, decreases SWB (Clark and Oswald, 1996; Ferrer-i-Carbonell, 2005; Luttmer, 2005; Kingdon and Knight, 2007). However, it is unlikely that when people compare themselves with their societal peers they rely solely on income information and disregard other aspects of life. This is so for at least three reasons. First, although the evidence is still scattered, recent empirical work points to pervasive comparison effects in several life domains, including health problems (Powdthavee, 2008) and labor market status (Clark *et al*., 2008). Similar findings are being reported for religiosity (Clark and Lelkes, 2009) and body shape (Clark and Etilé, 2011). Second, according to most psychological studies, upward and downward comparisons take place constantly in the society, are conspicuous, and involve a large number of human domains and outcomes (Lyubomirsky *et al*., 2001). Third, exclusively focusing on income comparisons may come at the cost of neglecting other channels by which individuals may improve their command over resources, such as financial and real assets, non-cash

[1]These indicators are aggregate measures of quality of life in different domains, including income inequality, poverty rates, unemployment persistence, health status, life expectancy, education attainment, and regional cohesion. Member States "are expected to use at least the primary indicators in their national strategy reports, if only to emphasise that in the context of the EU social inclusion process poverty and social exclusion are a relative concept that encompasses income, access to essential durables, education, health care, adequate housing, distance from the labour market" (European Commission, 2008, p. 16).

transfers from the government, and support from family and friends. If these channels operate, it is likely that individuals care about their ability to consume rather than to receive. In this respect, other aspects of deprivation apart from income may be relevant.

Studies focusing on aspects of life other than income are mostly lacking, however. An exception is Bellani and D'Ambrosio (2010) who use the 1994–2001 waves of the European Community Household Panel (ECHP) to provide pioneering estimates on the subject. Using a composite index of deprivation that comprises five domains (financial difficulties, basic necessities, housing conditions, durables, and social relations) they show that well-being depends negatively on non-monetary deprivation. Furthermore, they address the problem of social exclusion and its impact on individual well-being by looking at the persistence in a state of deprivation over consecutive periods. Our paper is close in spirit, although it exhibits three distinct features. First, it discriminates the impact of deprivation on SWB by different life domains. In doing so, it shed light on the aspects of deprivation that are more harmful for SWB. Second, the paper derives equivalence scales between household income and deprivation in the various domains. This equivalent income approach has recently gained currency in the literature in the task of unveiling the monetary value and costs of phenomena relevant for economic policy, including informal care to patients and educational mismatches (Van den Berg and Ferrer-i-Carbonell, 2007; Verhaest and Omey, 2009). The results allow us to put a price tag to various forms of deprivation. Third, there is the possibility that the SWB effects of being deprived operate through two channels. The first one stems from standard economic theory. From an individual point of view, more is better than less, irrespective of distributional aspects. Thus, we expect inaccessibility to specific items having a negative impact on SWB *per se*, i.e., regardless of the individual position in the societal distribution. The second channel consists of a comparison effect by which unfavorable comparisons with the societal peers depress individual levels of SWB. We test, therefore, whether comparison effects remain once controlling for distributional-unrelated effects.

The empirical analysis is based on panel estimates that account for the unobserved heterogeneity problem that surrounds the use of self-reported data. A common concern with this type of data is the existence of omitted individual characteristics that simultaneously influence the dependent and the explanatory variables. This set of idiosyncratic variables, rooted to personality in the present context, is likely to operate through three channels: first, by biasing SWB scores, due to the correlation of specific personality traits (extraversion, neuroticism, self-esteem) with self-reported measures of affect and satisfaction (Diener and Lucas, 1999; Judge *et al*., 2002); and second, by mediating the impact of comparison information on SWB. This concern is motivated by a corpus of field and laboratory studies in psychology examining the interplay between personality and the responsiveness to social comparisons (Wood and Van der Zee, 1997; Van der Zee *et al*., 1998). The third channel of correlation is with the right-hand side variables, especially income. If outgoing and extravert people are more successful in life, then a higher income is a prize rather than a causal factor of satisfaction with life (Graham *et al*., 2004). The paper deals with these caveats by proposing a random effects model extended to include: (i) a Mundlak term (Mundlak, 1978)

that corrects the potential correlation between the errors and the explanatory characteristics; and (ii) explicit controls for the respondents' personality traits. These were extracted from the Big Five Inventory module of personality included in the 2005 wave of the SOEP and a set of complementary questions aimed to measure the respondents' locus of control.

The paper is organized as follows. The next section provides an overview of the literature on economic comparisons and the multidimensional aspects of deprivation. Section 3 describes the data and the dimensions of deprivation used in the paper. The deprivation index is formally presented and related to previous measures which appeared in the literature. This index is used to summarily describe the extent of deprivation in the data. Section 4 presents the econometric model, discusses the estimating strategy, and derives the equivalent income formula. Section 5 reports the results and appraises the monetary equivalent of different forms of deprivation. Section 6 concludes.

2. Background and Previous Findings

The concepts of relative deprivation, relative standards, social aspirations, habituation, and downward–upward comparisons have long been used within the field of sociology and psychology to understand how individuals operate within and are influenced by reference groups (for a review, see Fujita, 2008). Although in economics the recognition of these influences has been relatively more recent, the evidence accumulated to date is substantial. In a few years the distinction between absolute and relative formulations of utility has proven a useful concept to rationalize a large set of unexplained phenomena in a variety of fields, including asset pricing (Abel, 2008), growth (Carroll *et al*., 2000), and consumption behavior (Fuhrer, 2000).

Advances at the theoretical level have been parallel to a new wave of empirical papers assessing the importance of relative income effects for SWB determination by means of large scale surveys and self-reported data. Researchers in the field usually have to decide by themselves how to identify a relevant group, and then show that the reference income or the individual rank within that group significantly accounts for some variation of the dependent variable. Typically the reference group is assumed to be composed of individuals with similar demographic characteristics (for instance, age, education, and gender) or living in the same geographical region (cities, states, and countries). Ferrer-i-Carbonell (2005) uses data from the 1992–97 waves of the SOEP to estimate a set of SWB equations. The results, based on a random effects (RE) ordered probit with a Mundlak correction term, show that the impact of comparison income on SWB is almost as large as the impact of permanent family income. The robustness of this finding across studies is remarkable. Blanchflower and Oswald (2004) use ordered logits and pooled Canadian and U.K. data to estimate SWB equations for different periods. Their results imply a trade-off ratio between comparison and family income of some –0.65 for the 1972–98 period in the U.S. and –0.48 between 1975 and 1998 in the U.K. In Helliwell and Huang (2010), the corresponding figure, based on Canadian cross-section datasets, ranges from –0.64 to –0.86 across estimating samples. Luttmer (2005) uses panel data from the U.S. to estimate a set of pooled OLS and

FE linear regressions. His baseline specification yields a coefficient of comparison income (–0.239) that is 1.9 times the coefficient of household income (0.123). Still, in the more refined model, an increase of the benchmark income and a similarly sized increase in own income render SWB unaffected. In the same line, Senik (2009) finds, using cross-section data from 28 countries included in the Life Transition Survey, significant negative effects of others' economic position on individual SWB.

Other interpretations of the data assume that people gain utility from occupying a higher ranked position within the reference group rather than from outpacing the mean level of the group. Clark *et al*. (2009) match individual economic satisfaction scores from eight years of ECHP data to measures of both own income and neighborhood income distribution. Their FE linear estimator finds evidence that economic satisfaction depends significantly and positively on the household's normalized rank in the neighborhood. Specifically, a 1-decile increase in the family rank is as important ceteris paribus as a 1.6 unit increase in log income or, to put it differently, to a rise in absolute income by a factor of almost 5. Based on Indonesian cross-section data from the year 2000, Powdthavee (2010b) provides very similar estimates. Studies based on job and life satisfaction report substantially lower estimates. Brown *et al*. (2008) use 1998 cross-section data from the U.K. to document how the worker's rank within the workplace earnings distribution affects self-reported levels of satisfaction in different job domains. Despite different specifications being used in the analysis, the results in the preferred model suggest that a 0.1 variation in rank can raise satisfaction with pay as much as a 12.7 percent increase in earnings. The only work using SWB data is Boyce *et al*. (2010). They use pooled data from the British Household Panel Survey to test the comparison income against the income rank model and find evidence in favor of the latter. In their estimates, household income is not a significant variable, while a 1-decile increase in rank has an impact of 0.03 points on the 1–7 SWB scale.

A methodological feature of the studies cited above is that relative income typically enters in the estimating equation as the mean income of the reference group or as the individual ordinal ranking within the group. This corresponds to a deprivation index that is a linear function of the average income in the group or, alternatively, the individual ranked position. As such, it abstracts from all the interpersonal comparisons that may take place between the individual and the rest of the society. This element is central in the deprivation index used in D'Ambrosio and Frick (2007) in that it is based on the sum of the gaps between an individual's income and the incomes of those who are richer.

While the well-being effects of income externalities have been largely documented, to date there is little evidence on the role of comparison information in other life dimensions. The concept of relative deprivation (Runciman, 1966) involves comparison in a variety of domains, insofar as social status is not solely determined by the individual income level. Although the theoretical literature on deprivation is quite extensive (see, for instance, Yitzhaki, 1979; Berrebi and Silber, 1985; Chakravarty, 1997; Chakravarty and Moyes, 2003), empirical applications are fewer and are seldom concerned with indicators other than income. As pointed out by Atkinson (1998) and Sen (1998), it is important to note a difference between deprivation measured in terms of income and an alternative approach where

functioning failures in various aspects of life determine the degree of deprivation. Unlike poverty, deprivation and social exclusion are better defined in the space of capabilities, as they refer to an individual's lack of access to the essentials of life.

The accumulation of disadvantages over a number of domains was first used by Gailly and Hausman (1984), who defined a measure of deprivation based on 32 items. Since then, this methodological framework has been used to analyze the risks of disadvantageous economic, social, and living conditions (for a review, see Dekkers, 2002). Papadopoulos and Tsakloglou (2002) provide a refinement to this method by constructing deprivation indicators in particular fields: income (poverty), living conditions, necessities of life, and social relations. The deprivation index in the domain of income is based on the 60 percent of the median income threshold, using the modified OECD equivalence scales. Living conditions are given by 22 items covering the availability of certain household amenities, the existence of particular problems in the accommodation, and the enforced lack of a number of durable goods. A person is considered to be at high risk of deprivation in this domain when she falls below the threshold value of 80 percent of the median of the distribution. A similar approach is applied to construct a deprivation indicator in the field of necessities of life. With respect to social relations, the authors classify as deprived those population members who talk to their neighbors "once or twice a month" or less frequently and, in addition, who meet friends "once or twice a month" or less frequently and are not members of a club or organization. Haisken-DeNew and Sinning (2010) follow a similar procedure to investigate the extent of social exclusion among immigrants. Whelan and Maître (2008) use the information provided by the European Union Statistics on Income and Living Conditions (EU-SILC) to construct deprivation indicators in five dimensions: basic deprivation, consumption, housing, health, and neighborhood/environment. More recently, Nolan and Whelan (2011) use data from the ECHP and the EU-SILC to emphasize the importance of this multidimensional perspective in an attempt to tackle the problems of poverty and social exclusion in Europe. In particular, they show that non-monetary indicators of deprivation may help governments to get a better understanding of the problem and identify which groups of the population should be targeted in framing anti-poverty strategies.

The contribution of Chakravarty and D'Ambrosio (2006) and Bossert *et al.* (2007) is to provide an axiomatization of different deprivation indexes. Here, the Yitzhaki index is reinterpreted by moving from income differences to functioning–failure differences in various life domains. Relative deprivation is given then by the average of the functioning–failure differences between the individual and those who are better off. Adopting this view, Bellani and D'Ambrosio (2010) consider various life domains to construct an aggregate index of deprivation.

3. Data and Deprivation Measures

3.1. *Data*

Conducted in Germany since 1984, the SOEP is a wide-ranging representative longitudinal study of households that contains a large set of personal, family, and labor market characteristics of household members. The units of analysis in the

present paper are individuals who are household heads.[2] To avoid mixing heterogeneous social conditions, we only consider individuals who live in West Germany. After dropping observations with missing values in the relevant variables, we retain 48,484 observations.

In the SOEP, the SWB question is: "How satisfied are you with your life as a whole, all things considered?" The answer to this question takes discrete values from 0 to 10 and hereafter will be referred to as SWB. Although there exist alternative measures of well-being based on objective indicators, the present paper relies on a subjective appraisal. There are two reasons for this choice. First, although crucial for evaluating people's quality of life, objective indicators may not be the only important ones. The scope of objective measures may be limited if people with identical circumstances experience different levels of well-being, or if we recognize that well-being is, beyond objective indicators, one of individuals' major concerns and one of the most relevant aspects in one's life. The second reason is that SWB has been extensively used in the literature to proxy for individuals' utility so as to understand individuals' preferences. The potential applications of the systematic use of SWB data to relevant macroeconomic and policy issues are well described in Frey *et al*. (2007) and van Praag and Ferrer-i-Carbonell (2010), among others.

Despite a long tradition among sociologists and psychologists, subjective data were subject to criticisms among some economists concerned about the potential biases arising from cultural differences, framing problems, cognitive bias, and mood effects. For reasons of space, the present paper simply notes that the evidence accumulated over recent years has persuaded most readers about the validity and consistency of self-reported data. Subjective measures of satisfaction and well-being have a predictive power over relevant actions and are related (in the expected direction) to a number of observable indicators, including physical health and longevity (Danner *et al*., 2001), suicide rates and macroeconomic fluctuations (Di Tella *et al*., 2003), unemployment (Clark *et al*., 2008), and objective quality of life (Clark and Wu, 2010). They also show a reasonable amount of internal consistency and temporal reliability: they correlate well with one another and with alternative methods of measurement, including ratings made by family and friends, facial measures of emotion, and a vast array of psychological and psychosocial indicators (Cacioppo *et al*., 2008).

Table 1 contains summary statistics of the estimating sample. The average SWB over the sample period is 7.1 (SD = 1.7).[3] Average family income amounts to 3,169 euros, of which approximately 11.6 percent (369 euros) is saved. Average age in the sample is 42.5 years, and the average educational attainment is about 12.4

[2]In the SOEP the questions on housing matters and conditions, accommodation, and different sources of income are answered by only one of the household members. We decided to retain only observations where this information was provided by the member with "the best knowledge about conditions under which the household functions" (which is the SOEP definition of the household head). The underlying assumption is thus that family members with a reduced knowledge of their household conditions are not in the best position to conduct relevant social comparisons in these matters.

[3]Well-being answers are skewed; individuals tend to be fairly happy with their lives, with almost 46 percent of the sample reporting an SWB score above 7 and only 2 percent reporting a score below 3.

TABLE 1
SUMMARY STATISTICS

	Mean	SD		Mean	SD
Life satisfaction	7.103	1.700	*Finances*		
Household savings	368.950	823.084	Monthly savings	368.950	823.084
Household income	3169.118	2143.248	Monthly income	3169.110	2143.248
Age	42.484	11.962	*Facilities*		
Woman	0.496	0.500	Kitchen	0.007	0.085
Years education	12.355	2.773	Bath	0.005	0.067
No. of adults	2.135	0.829	Toilet	0.004	0.062
No. of children	0.678	0.981	Heating	0.039	0.193
Employed	0.788	0.409	Balcony	0.175	0.380
Unemployed	0.067	0.250	Cellar	0.050	0.218
Inactive	0.145	0.352	Garden	0.352	0.477
Married	0.645	0.479	Boiler	0.003	0.055
Single	0.248	0.432	*Durables*		
Divorced	0.090	0.286	Telephone	0.009	0.094
Widow	0.017	0.129	Television	0.023	0.151
Foreigner	0.150	0.357	Washer	0.051	0.220
Berlin west	0.028	0.165	Car	0.100	0.300
Schleswig-Hols.	0.030	0.171	Microwave	0.248	0.432
Hamburg	0.022	0.146	Dishwasher	0.254	0.435
Lower Saxony	0.117	0.322	*Accommodation*		
Bremen	0.010	0.098	Squared meters	106.980	46.809
N-Rhein-Westfa.	0.271	0.445	No. of rooms	4.215	1.805
Hessen	0.091	0.287	*Health*		
R-Pfalz,Saarl.	0.079	0.270	Bad health status	0.125	0.331
Baden-Wuerttemb.	0.161	0.368	Disabled	0.079	0.270
Bavaria	0.190	0.393	Doctor visits > 12 per year	0.298	0.457
2000	0.096	0.294	*Social life (restricted sample)*		
2001	0.098	0.297	Never attends cultural events	0.314	0.464
2002	0.120	0.325	Never attends cinema, concerts	0.238	0.426
2003	0.127	0.333	Never attends religious events	0.477	0.499
2004	0.136	0.343	Never participates in volunteering	0.675	0.468
2005	0.156	0.363	Never participates in politics	0.892	0.310
2006	0.131	0.337	Never practices sports	0.325	0.468
2007	0.071	0.257			
2008	0.065	0.246			
Conscientiousness	5.896	0.912			
Neuroticism	3.923	1.227			
Extraversion	4.864	1.115			
Agreeableness	5.411	0.955			
Openness	4.572	1.176			
Internal LOC	5.135	0.696			
External LOC	3.501	0.871			

Source: SOEP 2000–08.

years of schooling. Women account for 49.6 percent of the sample and the number of adults and children per household is 2.14 and 0.68, respectively. Most individuals are employed (78.8 percent) and married or living with a partner (64.5 percent). In order to consider heterogeneous household size and cost-of-life adjustments, all income-based variables in the paper are transformed using the OECD equivalence scale and normalized into real terms using the yearly consumer price index.[4] The

[4]The OECD equivalized household size, E is defined as follows: let A be the number of household members who are older than 14, and let S be the household size; then $E = 1 + 0.7 \cdot (A - 1) + 0.5(S - A)$.

bottom part of the table reports the distribution of individuals by German federal states and by years in the sample.

3.2. *Dimensions of Deprivation*

A person's quality of life is measured along the following dimensions: (i) financial situation, (ii) housing facilities, (iii) durable goods, (iv) accommodation, (v) health, and (vi) social relations. Labor market status is not considered, as we are interested in analyzing deprivation in the entire population. These facets of life are very similar to those recommended in Eurostat (2000) for the evaluation of individual and household deprivation. Still, as there is as yet no unambiguous way of constructing these indicators, the items included in each dimension are discretionary and dictated by data availability.

The individual financial condition is assessed by means of two variables. The first and most obvious one is income. However, relying exclusively on this variable comes at the cost of ignoring incomes in kind from either private or public sources and, perhaps more importantly, the individual perception of command over resources. To partially overcome this problem, we additionally consider household monthly savings. This inclusion is intended to better assess the individual ability to cover the financial necessities of life. Rather than integrating income and savings to yield a single deprivation score, throughout the paper we use two distinct measures of financial stress: deprivation in income, and deprivation in savings. The third indicator covers the domain of *housing conditions*. This contains information on eight items related to the availability (yes/no) of certain household amenities, including: kitchen, bath, toilet, heating, balcony, cellar, garden, and boiler. Another deprivation dimension is based on six items on the availability of a number of *durable goods* among which telephone, television, washing machine, car, microwave, and dishwasher are considered. Deprivation in *accommodation* is accounted for on two objective measures of dwelling size: number of rooms, and square meters of the dwelling. Each of these variables is normalized using the equivalized number of adults at home. The *health* domain is measured according to three variables: the respondent's subjective evaluation of own health, whether the individual has some degree of disability, and the number of doctor visits per year. Having visited the doctor an average of more than once a month over the last year, having some degree of disability, and regarding own health status as "bad" or "very bad" are considered "failures" in these specific items.

The last dimension deals with deprivation in the domain of social relations. It is generally accepted that part of an individual's social capital is determined by the size of their relationship network, as this network can be used as an instrument for increased personal access to information and skill sets, enhanced power, and the access to specific goods and services. This paper asks whether deprivation in individual-level social capital, as measured by participation in a number of activities, is related to SWB. These activities include: attendance at cultural events; cinema and concerts; religious events; participation in volunteer work; politics; and the practice of sports. Individuals in the SOEP are asked to report the periodicity (weekly/monthly/less than monthly/never) of these events. We assume that

deprivation in each of these facets of social life occurs when participation in such types of activities "never" takes place.

Finally, throughout the paper it is assumed that the individual reference group is the whole population. The determination of the relevant reference group and the relevant reference outcome for a given class of individuals is ultimately an empirical question. The social context, the saliency of particular agents, and the social proximity among individuals are all likely to influence reference groups and outcomes. As large-scale surveys typically do not contain direct questions about the composition of reference groups, researchers in the field usually have to decide by themselves how to identify a relevant group. While some authors rely on a pure geographical approach whereby comparisons take place among people living in the same geographical area (Di Tella *et al*., 2003; Blanchflower and Oswald, 2004; Luttmer, 2005), some others identify comparable socio-demographic groups according to age or education (Ferrer-i-Carbonell, 2005; Boyce *et al*., 2010). Thus, our choice can be seen as a working compromise to avoid imposing the focus on a given dimension while disregarding others. Results for specific region, education, and age groups were similar and are available from the authors upon request.

3.3. *Deprivation Measures*

Following Bossert *et al*. (2007), deprivation is modeled as a function of the differential between an individual score q in the dimension under evaluation and the score of those who are better off. Let $\mathbb{N}$ be the set of all positive integers and $\mathbb{R}(\mathbb{R}_+, \mathbb{R}_{++})$ the set of all (all non-negative, all positive) real numbers. For a non-empty and finite set $M \subseteq \mathbb{N}$, the set $\mathbb{R}_+^M$ is the set of $|M|$-dimensional vectors of non-negative real numbers whose components are labeled by the elements in M. Moreover, let $\mathcal{N} = \mathbb{N}\backslash\{1\}$ and $\mathcal{P}$ be the set of all finite subsets of $\mathbb{N}$ with at least two elements. The individual $i \in \mathbb{N}$ functioning profile in the dimension under consideration is given by score $q_i \in \mathbb{R}_+$. The degree of deprivation suffered by the individual, $D_i(q)$, is defined as follows:

$$D_i(q) = 0 \; if \; B_i(q) = 0$$
$$D_i(q) = \alpha_i \frac{|B_i(q)|}{|N|^2} \sum_{j \in B_i(q)} (q_j - q_i) \; if \; B_i(q) \neq 0 \tag{1}$$

where $B_i(q) = \{j \in N | q_i < q_j\}$ is the set (number) of individuals whose score q is higher than that of i, and $\alpha_i \in \mathbb{R}_{++}$. Equation (1) is the product of two terms. $\frac{\sum_{j \in B_i(q)} (q_j - q_i)}{|N|}$ reflects the average score differential between the individual and those who are better off. When q is interpreted in terms of income, this term corresponds to the Yitzhaki (1979) index, that is, the average income shortfall from the incomes of all those who are richer than agent i. $\frac{|B_i(q)|}{|N|}$ is the share of these individuals and captures the pervasiveness of upward comparisons.

Sometimes in the literature, social exclusion is seen as a continuing state of deprivation. To avoid further complexity, the present paper disregards this tem-

poral aspect and focuses simply on a (static) state of deprivation in various life domains. Several deprivation indexes have been proposed in the literature. The choice of Bossert *et al*.'s (2007) approach to construct our multiple deprivation index is motivated by two considerations. First, this index belongs to a family of indexes that are closely related to standard inequality measures, such as the Gini coefficient; and second, it exhibits a number of good axiomatic properties, as highlighted in the original paper. As the data include dichotomic and continuous variables, depending on the domain under consideration, individual score q is calculated in two ways. In the domains of durables, housing facilities, health, and social relations q is given by the number of functionings from which the individual is not deprived:

$$q_i = \sum_{k \in K} f_k \tag{2}$$

where K is the number of items in the dimension under consideration and f_k is a dummy variable that captures access to item k.[5] By contrast, when the domain contains continuous variables (accommodation and finances), the individual score is given simply by the variable of interest (ex: income, savings). For the accommodation domain, q is given by the sum of the variables within that dimension (square meters and number of rooms) once they have been normalized to mean zero and unit variance. This normalization allows us to aggregate variables that are measured in different scales into a single score.[6] All deprivation indexes are calculated on a yearly basis and normalized by their mean and variances in the regressions stage of the paper.

3.4. *Deprivation in the Data*

Summary statistics of individuals' access to specific items is reported in Table 1. As expected, most individuals live in households with basic housing facilities, such as a kitchen, a bath, and a toilet. The failure rate in these items is typically below 1 percent, but it rises to 17.5 and 35.2 percent, respectively, when it comes to having a balcony and a garden. In terms of durables, few individuals lack a telephone (0.9 percent), a television (2.3 percent), a washing machine (5.1 percent), and a car (10.0 percent), while some 25 percent report not having a microwave or a dishwasher. The average number of rooms and square meters of the Germans' dwellings amount to 4.21 and 106.9, respectively. The next two domains refer to health and social relations. With regard to health, 12.5 percent of the sample individuals report having a "bad" or a "very bad" health condition, 7.9 percent have some degree of disability, and almost 30 percent report more than 12

[5]The same weight (= 1) is assigned to each item. Papadopoulos and Tsakloglou (2002) use a weighting scheme based on the importance of the functioning or capability. For every item, they assign to each household reporting the corresponding item a weight equal to the proportion of the households having access to that item. If a particular good is very rare (common), a household with such a good is assigned a low (high) welfare weight. This scheme may be assumed to reflect the importance a policy maker attaches to alternative items in a poverty alleviation proposal. The results under this alternative procedure presented little variations.

[6]The implicit assumption being that within this dimension a one standard deviation in squared meters is as important as a one standard deviation in the number of rooms.

TABLE 2
SPEARMAN CORRELATION COEFFICIENTS; DEPRIVATION LEVELS

	Income	Facilities	Durables	Accommodation	Health	Savings
Facilities	0.175***					
Durables	0.085***	0.347***				
Accommodation	0.519***	0.216***	0.029***			
Health	0.048***	0.036***	0.018***	–0.004		
Savings	0.516***	0.169***	0.107***	0.238***	0.052***	
Social relations	0.238***	0.232***	0.131***	0.156***	0.092***	0.198***

Notes: ***Significant at the 1% level.
Source: SOEP 2000–08.

yearly visits to the doctor. In terms of social life, a substantial fraction of respondents never participate in politics (89.2 percent), volunteer work (67.5 percent), or religious events (47.7 percent). Attendance at cultural events, cinemas, and concerts, and the practice of sport is relatively more frequent, with a non-participation rate below 35 percent.

Deprivation levels in the different domains are positively related, as shown in Table 2. This result warns that deprivation seldom affects a single aspect of life. Thus, for example, the correlation between income deprivation and the remaining domains is positive, statistically significant, and comprises between a minimum of 0.048 (health) and a maximum of 0.519 (accommodation). Figure 1 plots the cumulative distribution of the deprivation indexes.[7] The bottom right-hand corner of each panel contains relevant statistics, including the average value of the non-normalized level of deprivation, and the minimum, maximum, and modal value of the normalized level. As a matter of fact, cumulative distribution functions for discrete variables (housing facilities, durables, health, and social relations) are step functions, with number of steps being equal to number of items times years in the sample. A remarkable feature is the substantial variation in the degree of deprivation in the different domains. The distribution with the largest range corresponds to deprivation in facilities, with the index going from –0.53 to 12.27 times average deprivation in this domain, whereas the smallest corresponds to deprivation in savings, which ranges from –1.45 to 1.80 times the average. A second feature is the large proportion of observations concentrated toward the lower range of the distributions. In all cases the modal value is found to be well below the average deprivation level, and in three cases (facilities, durables, and health) more than 50 percent of the sample is found to be not deprived at all. Savings are the exception to this pattern, due to a large concentration of individuals with relatively large deprivation levels.[8]

[7]See Appendix.
[8]The sudden increase of the cumulative distribution of savings deprivation around its fourth quintile is due to individuals reporting zero savings. They account for 36.31 percent of the sample but display diverging levels of deprivation due to sensitive across-year variations in the savings distribution.

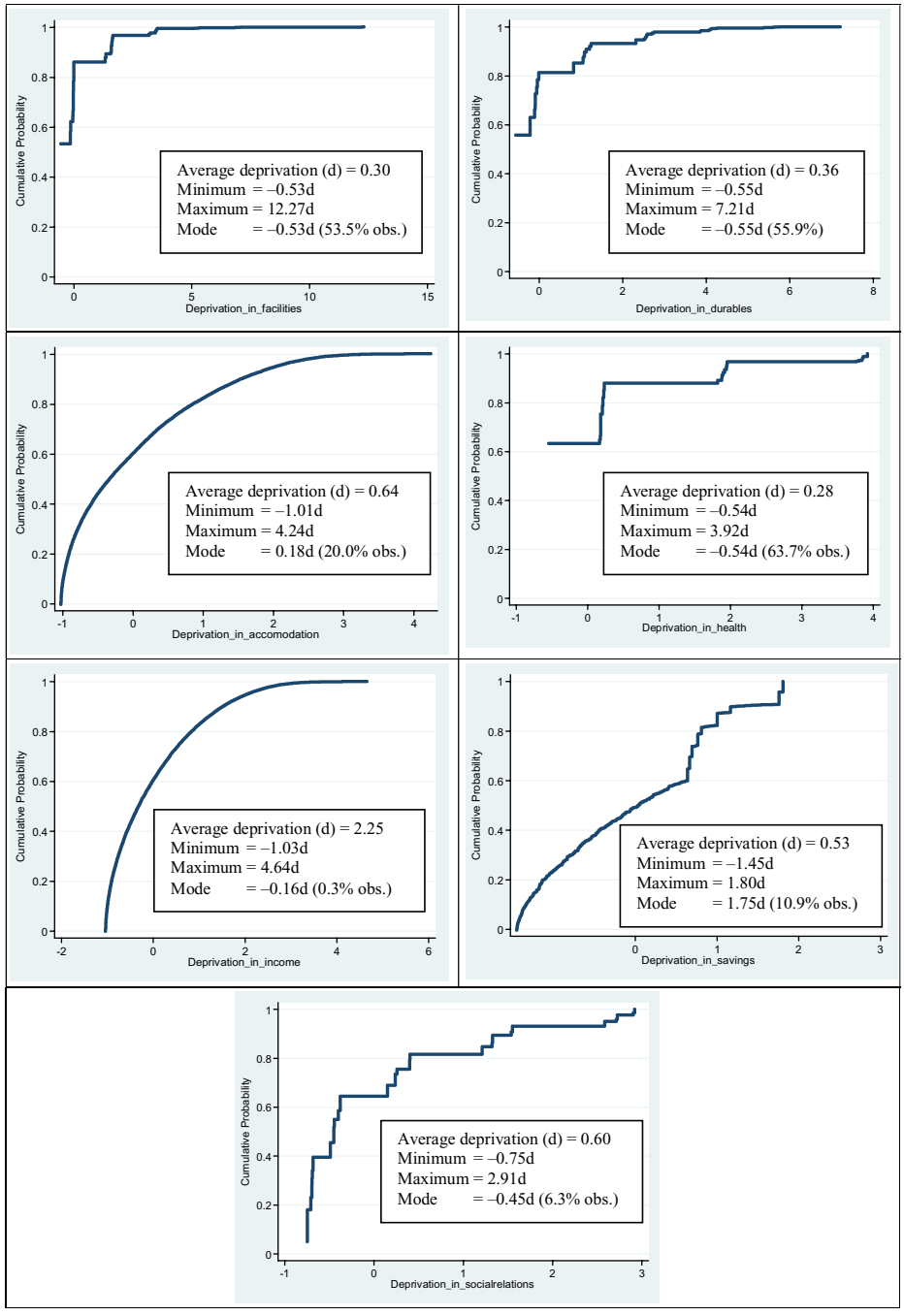

Figure 1. Cumulative Distribution Function of the Deprivation Indexes

Notes: Individual deprivation indexes are given by equation (1). *d* denotes the average level of deprivation in a given dimension. Besides the modal value of deprivation, the proportion of observations with modal deprivation is reported (in parentheses).

4. Estimating Strategy

4.1. *Specification and Research Hypotheses*

SWB is assumed to be a function of demographic characteristics (X) and income (y)

$$SWB = f(SWB^*(X, y, F, D)). \tag{3}$$

There is a possibility that the SWB effects of being deprived operate through two channels. The first one stems from standard economic theory. From an individual point of view, more is better than less, irrespective of distributional aspects. Thus, we expect inaccessibility to specific items having a negative impact on SWB *per se*, i.e., regardless of the individual position in the societal distribution. To allow for such effects, the SWB equation includes a vector F with the items described above, i.e., the variables measuring the individual functioning profile in the various life domains. The second channel consists of a comparison effect by which unfavorable comparisons with the societal peers depress individual levels of SWB. Such comparison information enters the equation by means of vector D, which includes the individual deprivation scores in the various life domains. By measuring the distance between the individual profile and the profile of those others who are better off, D captures the relativity aspect of deprivation.

The empirical analysis will be based on three different specifications of equation (3). Specification 1 assumes that SWB depends on the individual functioning profile in the various life domains (F), but not on her relative position in the society (D). This specification ignores potential comparison effects that may take place for SWB determination and it is merely used to show that most items are relevant sources of SWB. Specification 2 exclusively focuses on the relativity aspect of deprivation by assuming that SWB depends on comparisons with others (D) and not on the functioning profile (F). Specification 3 moves on to allow simultaneously for direct and relative effects and it is, therefore, the preferred specification. This model is used to test whether conditional on accessibility to specific items (F), having a deprivation level D has an additional, negative effect on SWB.

4.2. *Estimating Procedure*

We take the ranking SWB to be more nearly cardinal. While the assumption of cardinality instead of ordinality is typically unimportant (Ferrer-i-Carbonell and Frijters, 2004), it has the advantage of yielding coefficients that can be directly interpreted as marginal effects. We rely primarily on probit adapted ordinary least squares (POLS) as developed by van Praag and Ferrer-i-Carbonell (2008, pp. 29–34). Implementing POLS begins by deriving $\{\mu_j\}_{j=0}^{J}$ values of a standard normal associated with the cumulative frequencies of the J different categories of the dependent variable, with $\mu_0 = -\infty$, $\mu_J = \infty$. Then the expectation of a standard normally distributed variable is taken for an interval between any two adjacent values. Thus if the true unobserved continuous variable for individual i at time t is SWB_{it}^*, where the observed is $SWB_{it} = j$ if $\mu_{j-1} < SWB_{it}^* \leq \mu_j$, $j = 1, \ldots, J$, then the conditional expectation of the latent variable is given by:

$$(4) \qquad \ddot{SWB}_{it} = E(SWB^*_{it} | \mu_{j-1} < SWB^*_{it} < \mu_j) = \frac{n(\mu_{j-1}) - n(\mu_j)}{N(\mu_j) - N(\mu_{j-1})}$$

where n is the normal density and N is the cumulative normal distribution. This approach allows the application of a linear estimator on the conditional expectations:

$$(5) \qquad \ddot{SWB}_{it} = \alpha X_{it} + \beta y_{it} + \gamma F_{it} + \delta D_{it} + \upsilon_i + \eta_{it}$$

where v_i is a time-invariant effect and η_{it} is an independent error term. X includes age and age squared, years of completed education, household size (number of children and number of adults at home), and additional dummy variables for gender, marital condition, employment status, nationality, region, and year fixed effects. All continuous variables are entered in their logarithmic form.

4.3. *The Equivalent Income Concept*

Well-being equations can be used to assess the importance of a given dimension relative to other dimensions, and to construct equivalence scales between relevant variables. Here, the analysis will be centered on the impact that deprivation has on SWB, using household income as a reference scale. Although other variables can be used, employing income as a reference measure provides a clear-cut interpretation. This equivalent income approach is very similar to the one used in Van den Berg and Ferrer-i-Carbonell (2007) and Verhaest and Omey (2009) to estimate the shadow value/cost of informal medical care and educational mismatches, respectively.

Consider the impact of a rise of deprivation in domain r. Its equivalent income is defined as the income variation needed to leave the individual SWB unaltered. From equation (5), this implies, ceteris paribus, $\Delta y = -\frac{\delta_r}{\beta}\Delta D_r$, where Δy denotes variation in log income and ΔD_r denotes variation in domain's r level of deprivation. Taking into account that $\Delta y = ln(1 + \Delta y)$, where $y = log(Y)$, the equivalent income formula can be expressed as a percentage variation in Y:

$$(6) \qquad \Delta Y = exp\left(-\frac{\delta_r}{\beta}\right) - 1.$$

4.4. *Controlling for Unobserved Heterogeneity*

An important concern in this type of study is how to deal with heterogeneity between individuals that is largely considered to be unobservable. The observed correlation between deprivation and satisfaction with life may be not causal if people with certain personality traits are less productive and more deprived and, at the same time, more prone to report themselves as unhappy. In this paper, the extent of unobserved heterogeneity is controlled by means of an RE model extended along two dimensions.

The first refinement is a Mundlak correction term. An implicit assumption of RE models is that the random component v_i is uncorrelated with the explanatory variables. This may be seen as a rather strong assumption insofar as the dependent as well as the right-hand side variables may be driven by omitted characteristics. Thus, for example, predispositionally happy individuals are more likely to marry and form larger households (Stutzer and Frey, 2006) and be more successful in life (Graham *et al*., 2004). The Mundlak term is intended to control for such correlations and consists of a vector $\bar{X}_i^M$ with the time-averaged values of a subset of M explanatory variables. With this strategy the unobserved heterogeneity of the standard RE model is assumed to consist of two parts, $v_i = u_i + \lambda \bar{X}_i^M$. The first part is a pure error term. The second part is assumed to vary linearly with the within-group means, whereby a possible correlation between the independent variables and the idiosyncratic characteristics is accounted for. Thus, equation (5) becomes:

$$\ddot{SWB}_{it} = \alpha X_{it} + \beta y_{it} + \gamma F_{it} + \delta D_{it} + \lambda \bar{X}_i^M + u_i + \eta_{it} \tag{7}$$

with $u_i \sim N(0, \sigma_u^2)$, $\eta_{it} \sim N(0,1)$, $Cov(u_i, \eta_{it}) = 0$. The Mundlak variables were chosen to be: proportion of years in the panel for which the individual is employed, proportion of years in the panel for which the individual is unemployed, (individual) time averaged value of years of schooling, number of children at home, and number of adults. Although discretionary, these choices are broadly in line with previous work.

The second extension of the RE model concerns the inclusion of explicit controls for the respondent's personality, the underlying assumption being that personality is the most important component of individual heterogeneity in SWB equations (Boyce, 2010). The 2005 wave of the SOEP includes a short version of the Big Five Inventory (BFI). This model represents a widely accepted approach to conceptualizing personality. After aggregating across items, the BFI provides a score for the five major traits that define human personality across cultures: *conscientiousness*, a tendency to be organized, strong-willed, persistent, reliable, and a follower of rules and ethical principles; *neuroticism*, the tendency to experience negative emotions such as anxiety and depression; *extraversion*, the tendency to be sociable, warm, active, assertive, cheerful, and in search of stimulation; *agreeableness*, the dimension of interpersonal relations, characterized by altruism, trust, modesty, and cooperativeness; and *openness to experience*, the tendency to be imaginative, creative, unconventional, and emotionally and artistically sensitive. The BFI questionnaire used in the SOEP is based on three items for each personality dimension, which makes a total of 15 items. Despite psychologists typically working with longer questionnaires, this shortened version, known as the BFI-S, has been validated against longer inventories. The questionnaire, the scale of responses, and encompassing tests of internal consistency are shown in the Supplementary Appendix.

Locus of control (LOC) is measured externally and internally. People with an external LOC believe that their behavior is guided by fate, luck, or other external circumstances, while those with an internal LOC believe that their behavior is guided by their personal decisions and efforts. The extent to which one finds social comparisons inspiring or threatening is known in the field of psychology to depend

on whether one finds a sense of control over the dimension under evaluation (Lockwood, 2002). In the SOEP, LOC is surveyed with ten items, of which four measure internal and the other six measure external LOC.

The BFI and LOC information gathered in the 2005 wave of the SOEP were not surveyed in any of the previous or subsequent years. To deal with this limitation, it is assumed that these constructs are constant over the eight-year period.[9] The average scores of the personality dimensions are reported in the bottom part of Table 1. In the regressions stage of the paper, these were normalized to a mean zero and unit variance.

5. Results

5.1. *Deprivation and SWB*

The first column of Table 3 reports the results of Specification 1. For expositional purposes, we first describe the main findings regarding the socioeconomic characteristics. Then, we move on to address the effects of deprivation.

As expected, family income is closely related to SWB, as shown by a coefficient that is highly significant (0.160). The effect of age is u-shaped, with a minimum at age 42. Individuals with a higher level of education tend to report higher levels of SWB, although the estimated effect fails to be statistically significant. Conditional on equivalized household income, individuals living in larger households (either more adults or more children) report higher levels of SWB. This is also the case of women and immigrants. Relative to the reference category (inactive individuals), the unemployed are significantly worse off, while the employed report similar SWB scores. Being single or divorced attract negative, statistically significant effects, relative to being married. These results do not present surprises for the connoisseur of the literature, as they have been extensively documented in previous work (Di Tella and MacCulloch, 2003; Blanchflower and Oswald, 2004; van Praag and Ferrer-i-Carbonell, 2008).

Next, we switch to the role of functioning profiles and deprivation in various aspects of life. Perhaps the most relevant finding is that SWB is closely related to failure in specific items within most of the dimensions considered. As shown above, income is positively related to SWB, and this is also the case for savings, though to a lower extent. Indeed, comparison of the two coefficients shows that one extra euro of savings raises SWB by slightly less than one fifth (0.030) of the expected rise from having one extra euro of income (0.160). Individuals living in dwellings without a kitchen (–0.111), a balcony (–0.026), or a garden (–0.042) are significantly worse off, the effects being statistically significant at conventional levels. The role of durable goods also appears to be important. Not having a telephone (–0.098), a washing machine (–0.034), or a microwave (–0.034) are associated with lower SWB levels. By contrast, lacking a television is largely innocuous, if not

[9]This should not be seen as a stringent assumption, as it is generally accepted that an adult's personality traits are fairly stable over time (Roberts and DelVecchio, 2000; Costa and McCrae, 2002). In our sample, the respondents' mean age is 42.5 years and they are interviewed during no more than eight consecutive years, so that the potential interdependency between early life events and personality should not matter much.

TABLE 3

SUBJECTIVE WELL-BEING POLS ESTIMATES, RANDOM EFFECTS

	Specification 1		Specification 2		Specification 3	
	Coeff.	z-statistic	Coeff.	z-statistic	Coeff.	z-statistic
Ln (household income)	0.160***	12.84	0.080***	3.66	0.104***	4.68
Log (age)	–4.472***	–9.77	–4.713***	–10.17	–4.476***	–9.77
Log (age)^2	0.599***	9.42	0.631***	9.80	0.599***	9.42
Woman	0.094***	6.24	0.096***	6.30	0.092***	6.15
Years education	0.126	1.03	0.145	1.18	0.124	1.01
Log (adults)	0.229***	6.98	0.305***	9.26	0.276***	7.91
Log (children)	0.090***	5.30	0.090***	5.35	0.084***	4.97
Employed	0.020	1.24	0.010	0.66	0.017	1.07
Unemployed	–0.193***	–9.95	–0.201***	–10.33	–0.194***	–9.96
Single	–0.116***	–6.57	–0.118***	–6.61	–0.114***	–6.44
Divorced	–0.034*	–1.72	–0.034*	–1.73	–0.032*	–1.62
Widow	–0.003	–0.06	–0.012	–0.24	0.002	0.05
Foreigner	0.075***	3.59	0.074***	3.47	0.086***	4.08
Big Five dimensions and LOC						
Conscientiousness	0.009	1.08	0.007	0.88	0.008	1.05
Neuroticism	–0.114***	–14.74	–0.116***	–14.73	–0.114***	–14.82
Extraversion	0.017**	2.12	0.016**	2.00	0.016**	2.09
Agreeableness	0.036***	4.71	0.035***	4.53	0.036***	4.74
Openness	0.047***	6.16	0.047***	6.02	0.047***	6.10
Internal LOC	0.045***	6.06	0.046***	6.05	0.046***	6.13
External LOC	–0.179***	–22.59	–0.182***	–22.49	–0.178***	–22.49
Finances						
Ln (household savings)	0.030***	18.41			0.026***	8.00
Deprivation in savings			–0.084***	–16.48	–0.012	–1.13
Deprivation in income			–0.044***	–4.11	–0.030***	–2.80
Facilities						
Kitchen	–0.111**	–2.32			–0.123**	–2.29
Bath	0.076	0.92			0.055	0.63
Toilet	–0.111	–1.27			–0.130	–1.41
Heating	–0.006	–0.25			–0.022	–0.69
Balcony	–0.026**	–2.00			–0.039*	–1.75
Cellar	–0.005	–0.28			–0.023	–0.81
Garden	–0.042***	–3.68			–0.047***	–2.65
Boiler	0.024	0.33			0.002	0.03
Deprivation in facilities			–0.012**	–2.35	0.015	0.94
Durables						
Telephone	–0.098**	–2.41			–0.056	–1.23
Television	0.028	0.99			0.079**	2.11
Washer	–0.034*	–1.65			0.018	0.57
Car	0.039**	2.20			0.082***	3.11
Microwave	–0.034***	–2.89			–0.002	–0.11
Dishwasher	0.004	0.28			0.037	1.91
Deprivation in durables			–0.010*	–1.88	–0.037**	–2.06
Accommodation						
Square meters	0.000	–0.12			0.000	–0.31
No. of rooms	–0.015	–1.43			–0.022**	–2.04
Deprivation in accommodation			–0.015**	–2.20	–0.023***	–3.06
Health						
Bad health status	–0.436***	–35.73			–0.390***	–14.15
Disabled	–0.092***	–4.57			–0.043	–1.27
Doctor visits > 12 per year	–0.047***	–5.72			–0.017	–0.92
Deprivation in health			–0.150***	–32.27	–0.032*	–1.86
Mundlak correction terms	Yes		Yes		Yes	
Region and year fixed effects	Yes		Yes		Yes	
R-squared (overall)	0.238		0.222		0.238	
No of obs	48,484		48,484		48,484	

Notes: *Significant at the 10% level, **5% level, ***1% level.

beneficial, a result that is consistent with Frey *et al.*'s (2007) results on the null or even negative correlation between television consumption and life satisfaction. In terms of accommodation quality, the equation fails to detect a significant effect of dwelling size, measured by either squared meters or number of rooms. The coefficients of the different health items are in the expected direction. Disability and frequent doctor visits are both associated with lower SWB. Still, the largest decrease is among individuals reporting bad health status, with an estimated effect, –0.436, that is practically one order of magnitude above the effect of reporting frequent doctor visits and almost five times the effect of disability.

We are tempted to interpret the previous coefficients as "impacts." However, the partial correlation could be the result of reverse causation if, for a given household income, unhappy people are more prone to lack certain housing facilities and durables, save less, or have worse health. Reverse causality may affect household income itself if happier people tend to make more money. There are two reasons why we do not consider the potential reverse causality problematic in the present case. First, a number of recent studies have addressed whether the correlation between SWB and health (Diener and Chan, 2011), income (Powdthavee, 2010a), consumption, and, more generally, wealth (Headey *et al.*, 2011) is spurious. Despite some results pointing to two-sided causation, the evidence indicates that the main effects are from these covariates to SWB, and not the other way round. Second, the results are already controlling for individuals' personality. If there are idiosyncratic factors inducing simultaneously dissatisfaction with life and deprivation, these have been already factored out from the results.

The personality estimates in Table 3 are interesting on their own. SWB depends positively on extraversion, agreeableness, and openness, and negatively on neuroticism. Thus, for example, a one standard deviation increase in neuroticism has an effect of about –0.114 score points on the dependent variable, the effect of this specific trait being larger and of opposite sign than the joint effect of the remaining personality dimensions. Interestingly, the LOC measures also play a role. The coefficient of internal LOC shows that people convinced about the role of personal decisions and efforts tend to report higher SWB. By contrast, SWB is lower among individuals who believe that fate, luck, or other external circumstances are the leading force behind human fate. These results are consistent with common knowledge in the field of psychology showing that the BFI and LOC are significantly related to positive affect and, more generally, well-being in different life domains (Diener and Lucas, 1999; Judge *et al.*, 2002).

Specification 2 considers that access to specific items does not exert a direct effect on SWB. Instead, its impact is through social comparison processes, according to which a lower societal position reduces SWB. Two things are worth noting. First, the coefficient of household income decreases by a factor of 2, from 0.160 to 0.080, once we allow for financial deprivation effects. This result suggests that to some extent income gives an extra bit of satisfaction with life if it allows a downward comparison to be made, a result that is consistent with the literature on income comparisons. Second, in all domains considered, deprivation carries a substantial loss in SWB. This is particularly evident in the domain of health and financial conditions. The estimated effects, which refer to a one standard deviation increase in the corresponding deprivation score, are significant at the 1% level and

as large as –0.044 (income), –0.084 (savings), and –0.150 (health). This represents as much as 22–75 percent the effect of being unemployed, which is one of the dimensions known to be more closely related to SWB. Deprivation in the remaining domains appears to be less relevant, although the coefficients are still significant at conventional levels. In these cases, a rise in the corresponding deprivation score decreases the dependent variable by between 0.010 (durables) and 0.015 (accommodation) points.

The results under Specification 2 may overstate the role of social comparisons for SWB determination insofar as they are not controlling for distributional-unrelated effects. In the end, having health problems depresses the quality of life regardless of the health status of the societal peers, and a similar reasoning applies to other facets of life. It is convenient therefore to test whether comparison effects remain once the domain-specific items are entered in the regressions. This is done in the last column of Table 3 (Specification 3). The resulting coefficients are generally lower, and suggest that in some cases (facilities and savings) the effects cannot be attributed to social comparison processes. Similarly, negative comparison information in health results in lower SWB, but the estimated effect is much lower than predicted by Specification 2.[10] This notwithstanding, the results give support to the existence of social comparison processes in most life domains. For a given level of household income, an unfavorable income position results in dissatisfaction with life (–0.030), and a similar pattern is found for durables (–0.037) and accommodation (–0.023).

5.2. *The Equivalent Income of Deprivation*

The central question is: How much extra income would have to be given to the person to compensate exactly for a sudden increase in their deprivation level? Let as consider a switch from average to moderate income deprivation (one standard deviation above the sample average level of deprivation). The last column of Table 3 reports the results of the preferred specification. According to equation (6), such deterioration of the individual's relative position could be offset by a 33.4 percent increase in own income. For the sample average income, this variation amounts to €1,059. By the same reasoning, moderate deprivation in durables would require a 42.7 percent increase in own income to leave the person just as happy as before, while deprivation in accommodation and health should carry compensations of 24.8 and 36.0 percent, respectively. It is interesting to note that the price tag of deprivation in income, durables, accommodation, and health more than doubles if we are to consider not moderate but severe deprivation (two standard deviations above the average deprivation level). In the facilities and savings domains the income-deprivation trade-off does not apply, insofar as

[10]Under similar circumstances, people with certain personality traits (optimism, self-confidence) may be more likely to report better health status. Despite the fact that use of subjective measures is common in the field and the fact that our equation includes explicit controls for the respondent's personality traits, we conducted auxiliary computations to assess the sensitivity of the coefficient on health deprivation to the inclusion of this variable. Using Specification 3 as the relevant model, the results, not reported here, are suggestive of a somewhat larger and more significant effect (–0.043 against the –0.032 reported in the paper).

comparison information in these dimensions does not attract significant effects on SWB.

These results show that, first, small changes in financial deprivation can more than offset the well-being benefits of sustained increases in people's income. This result can be linked to and is supportive of the findings reported in earlier studies focusing on the extent and well-being consequences of income comparisons. Second, there exist other channels through which societal comparisons take place, their role being roughly as important as that of the income dimension. And third, and perhaps more important, there is evidence to suggest that the well-being costs of multiple deprivation are large. Individuals moderately deprived in terms of both accommodation and health would require a 70.5 percent increase in their income level to be just as happy as average individuals. This figure rises to 127.7 percent if there is also income deprivation.

5.3. *Fixed Effect Results*

The preference for an extended RE model can be seen as a working compromise to, on the one hand, control for time-invariant unobservables and, on the other hand, use both within and between individual information. Still, the estimating model imposes a specific functional form for the relationship between the error term and the covariates through the Mundlak term. A second potential limitation is that it assumes that the contribution of personality to SWB is additively decomposed into several (linear) sub-functions, each of them rooted to a specific personality factor. FE models are not subject to these constraints and, thus, can be thought of as an alternative benchmark against which to compare our results. In exchange, however, they preclude the researcher from obtaining reliable estimates on characteristics that have zero or low within-person variation, leaving no room for uncovering improvements to the individual's subjective well-being that may simply arise, for example, from having a permanently high income or being in a permanently high state of deprivation.

To test the sensitivity of the results, Table 4 reports FE estimates. For simplicity reasons, the coefficients of the individual demographic characteristics have been omitted. The results are remarkably consistent with the previous findings. All items that were found to negatively and significantly affect SWB under Specification 1 with the RE model are also found to negatively predict SWB with FE, and the same applies to items unrelated to SWB. Differences are also small when it comes to Specifications 2 and 3. In the latter case, deprivation in facilities and savings are not statistically significant in either model, whereas in moving from RE to FE the negative impact of deprivation changes only slightly, from –0.030 to –0.038 in the domain of income, from –0.023 to –0.016 in the domain of accommodation, and from –0.032 to –0.040 when it comes to health. The exception is deprivation in durables, which fails to attract a significant coefficient under FE. Interestingly, the FE estimates result in larger deprivation–income trade-offs, due to the lower coefficient of the household income variable (0.057). An increase of one standard deviation in deprivation in income, accommodation, and health should be compensated, according to the FE estimates, by increases of 94.8, 31.4, and 101.7 percent in household income, respectively. These compensations are well

TABLE 4
SUBJECTIVE WELL-BEING POLS ESTIMATES, FIXED EFFECTS

	Specification 1		Specification 2		Specification 3	
	Coeff.	z-statistic	Coeff.	z-statistic	Coeff.	z-statistic
Ln (household income)	0.126***	9.94	0.041*	1.85	0.057***	2.54
Finances						
Ln (household savings)	0.020***	13.24			0.021***	6.86
Deprivation in savings			–0.054***	–11.30	0.002	0.24
Deprivation in income			–0.047***	–4.51	–0.038***	–3.62
Facilities						
Kitchen	–0.105**	–2.34			–0.113**	–2.18
Bath	–0.043	–0.56			–0.055	–0.66
Toilet	–0.085	–1.06			–0.099	–1.17
Heating	0.001	0.05			–0.010	–0.30
Balcony	–0.025*	–1.82			–0.034	–1.46
Cellar	0.002	0.11			–0.010	–0.34
Garden	–0.020	–1.61			–0.024	–1.27
Boiler	0.026	0.39			0.010	0.13
Deprivation in facilities			–0.012**	–2.20	0.009	0.60
Durables						
Telephone	–0.095**	–2.28			–0.072	–1.53
Television	–0.004	–0.15			0.027	0.70
Washer	–0.036*	–1.80			–0.006	–0.19
Car	0.030	1.59			0.056**	2.03
Microwave	–0.053***	–4.18			–0.035*	–1.75
Dishwasher	–0.002	–0.14			0.017	0.85
Deprivation in durables			–0.019***	–3.52	–0.021	–1.18
Accommodation						
Square meters	–0.001	–1.50			–0.001	–1.60
No. of rooms	0.001	0.14			–0.003	–0.25
Deprivation in accommodation			–0.009	–1.27	–0.016**	–2.01
Health						
Bad health status	–0.371***	–33.01			–0.314***	–12.49
Disabled	–0.067***	–2.99			–0.004	–0.13
Doctor visits > 12 per year	–0.044***	–5.88			–0.006	–0.37
Deprivation in health			–0.133***	–29.32	–0.040***	–2.55
Region and year fixed effects	Yes		Yes		Yes	
R-squared (overall)	0.126		0.116		0.125	
No. of obs.	48,484		48,484		48,484	

Notes: *Significant at the 10% level, **5% level, ***1% level.

Additional controls: age and age squared, years of completed education, household size (number of children and number of adults at home), and additional dummy variables for marital condition and employment status.

above the figures obtained with RE and are, thus, suggestive of enlarged deprivation effects.

5.4. *Including Social Relations*

In Tables 5 and 6, the equation is extended to include deprivation in the domain of social relations. This comes at a cost of losing almost 49 percent of the

TABLE 5

Subjective Well-Being POLS Estimates with Social Relations, Random Effects

	Specification 1		Specification 2		Specification 3	
	Coeff.	z-statistic	Coeff.	z-statistic	Coeff.	z-statistic
Ln (household income)	0.186***	11.05	0.088***	2.98	0.118***	3.90
Finances						
Ln (household savings)	0.032***	14.27			0.026***	5.54
Deprivation in savings			–0.093***	–13.07	–0.021	–1.46
Deprivation in income			–0.050***	–3.44	–0.036***	–2.47
Facilities						
Kitchen	–0.051	–0.78			–0.067	–0.91
Bath	0.074	0.66			0.050	0.42
Toilet	–0.132	–1.12			–0.159	–1.28
Heating	0.052*	1.68			0.033	0.81
Balcony	–0.031*	–1.87			–0.047	–1.60
Cellar	0.015	0.58			–0.006	–0.15
Garden	–0.055***	–3.71			–0.061***	–2.66
Boiler	0.008	0.08			–0.015	–0.14
Deprivation in facilities			–0.008	–1.17	0.017	0.83
Durables						
Telephone	–0.124**	–2.70			–0.092*	–1.71
Television	0.031	0.81			0.068	1.37
Washer	–0.039	–1.45			–0.001	–0.02
Car	0.078***	3.43			0.112***	3.21
Microwave	–0.024	–1.58			0.000	–0.01
Dishwasher	0.017	1.06			0.042*	1.69
Deprivation in durables			0.000	–0.07	–0.027	–1.15
Accommodation						
Square meters	0.000	0.30			0.000	0.19
No. of rooms	–0.022	–1.60			–0.027*	–1.92
Deprivation in accommodation			–0.015*	–1.72	–0.021**	–2.07
Health						
Bad health status	–0.506***	–29.56			–0.485***	–12.41
Disabled	–0.089***	–3.47			–0.066	–1.45
Doctor visits > 12 per year	–0.042***	–3.57			–0.029	–1.15
Deprivation in health			–0.165***	–26.24	–0.014	–0.57
Social life						
Never attends cultural events	–0.076***	–5.61			–0.049***	–2.92
Never attends cinema, concerts	0.036**	2.45			0.067***	3.58
Never practices sports	–0.037***	–2.79			–0.011	–0.66
Never participates in volunteer work	–0.006	–0.45			0.005	0.38
Never participates in politics	–0.002	–0.12			0.000	0.02
Never attends religious events	–0.064***	–5.09			–0.043***	–2.89
Deprivation in social relations			–0.051***	–7.89	–0.036***	–2.55
Mundlak correction terms	Yes		Yes		Yes	
Region and year fixed effects	Yes		Yes		Yes	
R-squared (overall)	0.257		0.237		0.258	
No. of obs	24,737		24,737		24,737	

Notes: *Significant at the 10% level, **5% level, ***1% level.

Additional controls: age and age squared, years of completed education, household size (number of children and number of adults at home), and additional dummy variables for gender, marital condition, employment status, and nationality.

observations, insofar as information on this topic was absent from the 2000, 2002, 2004, and 2006 waves of the dataset. For reasons of space, the estimates for the personality traits and the individual demographic characteristics are omitted. Due to the similarity of the results, only the estimates from the RE model (Table 5) are discussed.

TABLE 6

Subjective Well-Being POLS Estimates with Social Relations, Fixed Effects

	Specification 1		Specification 2		Specification 3	
	Coeff.	z-statistic	Coeff.	z-statistic	Coeff.	z-statistic
Ln (household income)	0.182***	9.00	0.086**	2.35	0.108***	2.94
Finances						
Ln (household savings)	0.020***	7.92			0.018***	3.85
Deprivation in savings			–0.052***	–6.81	–0.004	–0.26
Deprivation income			–0.050***	–2.98	–0.039**	–2.34
Facilities						
Kitchen	–0.046	–0.70			–0.064	–0.84
Bath	–0.032	–0.28			–0.057	–0.047*
Toilet	–0.042	–0.35			–0.064	–0.51
Heating	0.105***	2.92			0.086*	1.82
Balcony	–0.040**	–1.99			–0.056*	–1.65
Cellar	0.019	0.66			–0.001	–0.02
Garden	–0.037**	–2.03			–0.047	–1.71
Boiler	0.067	0.64			0.045	0.41
Deprivation in facilities			–0.002	–0.31	0.014	0.63
Durables						
Telephone	–0.137***	–2.63			–0.139**	–2.25
Television	–0.048	–1.12			–0.045	–0.80
Washer	–0.068**	–2.27			–0.068	–1.42
Car	0.083***	2.90			0.085**	2.07
Microwave	–0.038*	–1.94			–0.037	–1.21
Dishwasher	0.011	0.55			0.012	0.39
Deprivation in durables			–0.018**	–2.13	0.000	–0.01
Accommodation	***		***			
Square meters	–0.001**	–2.12			–0.001**	–2.11
No. of rooms	0.008	0.52			0.007	0.43
Deprivation in accommodation			–0.003	–0.29	–0.009	–0.75
Health						
Bad health status	–0.389***	–22.00			–0.365***	–9.18
Disabled	–0.061*	–1.74			–0.034	–0.65
Doctor visits > 12 per year	–0.041	–3.48			–0.027	–1.03
Deprivation in health			–0.137***	–19.08	–0.016	–0.64
Social life						
Never attends cultural events	–0.053***	–3.79			–0.031*	–1.76
Never attends cinema, concerts	0.007	0.49			0.034*	1.77
Never practices sports	–0.054***	–3.83			–0.032*	–1.84
Never participates in volunteer work	0.010	0.66			0.020	1.25
Never participates in politics	–0.008	–0.40			–0.006	–0.28
Never attends religious events	–0.035**	–2.40			–0.017	–0.97
Deprivation in social relations			–0.045***	–6.14	–0.032**	–2.16
Region and year fixed effects	Yes		Yes		Yes	
R-squared (overall)	0.008		0.006		0.008	
No. of obs	24,737		24,737		24,737	

Notes: *Significant at the 10% level, **5% level, ***1% level.

Additional controls: age and age squared, years of completed education, household size (number of children and number of adults at home), and additional dummy variables for marital condition and employment status.

The findings are generally supportive of the idea that individuals care about social life. The first column shows that social relations, as measured by the attendance at cultural and religious events and the practice of sports are related in a significant way to the variable of interest. By contrast, people who never partici-

pate in politics and volunteer are not particularly unhappy with their lives. Attendance at the cinema is a striking case, insofar as people who are never involved in this activity report higher, not lower, levels of SWB. Still, this observation is concomitant with the previous findings for television owners.

More importantly, Specification 3 shows that conditional on the individual social profile, unfavorable comparison in this domain results in well-being losses (–0.036).[11] Despite being sensitively lower than in Specification 2, the coefficient is well-defined. According to the equivalent income formula, a switch from average to moderate social deprivation matters as much as a 36.0 percent variation in household income. This compensation is similar to that required for income deprivation, and definitely larger than the compensation required for deprivation in other domains. The FE results in Table 6 are broadly supportive of these findings.

It is worth noting that switching to the more restricted sample results in some degree of variation in the point estimates. Such inconsistencies should not ring alarm bells if we recall that the new panel is practically biannual and significantly smaller. Moreover, meaningful similarities are also apparent between Tables 3 and 5. Thus, for example, deprivation in facilities fails to be a relevant variable regardless of the sample used. Similarly, in the full sample, deprivation in income and accommodation carry a penalty on SWB (–0.030 and –0.023, respectively) that is very close to that found in the restricted sample (–0.036 and –0.021). Moreover, the income–deprivation trade-off in these two dimensions changes little when we move from the unrestricted to the restricted sample (33.4 and 24.8 percent, respectively, against 35.7 and 19.5 percent).

6. Conclusions

Tackling deprivation in different aspects of life has become a subject of great interest for EU authorities and institutions. Deprivation and social exclusion imply a major discontinuity in the relationship of the individual with the rest of society, inadequate social participation, lack of social integration, and lack of power. To the extent that it undermines the well-being of citizens, the design of actions and initiatives aimed at alleviating these problems is a major concern for policymakers.

This paper takes a step toward measuring the well-being effects of deprivation in a number of domains, including income, savings, durable goods, household facilities, accommodation, health, and social relations. The results were based on the 2000–08 waves of the SOEP, and on an RE model extended to include a Mundlak correction term and explicit controls for the respondents' personality traits. We found evidence to suggest that people care about social comparison information in a number of domains, not just income. Using an equivalent income approach, we put a price tag on different sources of deprivation. We found that in terms of well-being a switch from average to moderate deprivation in income, accommodation, and health matters as much as a decrease in household income of

[11]As religiosity is a peculiar matter, we conducted some sensitivity analysis by dropping this variable from the social relations dimension. This resulted into a small increase in the corresponding deprivation effect, from –0.036 (z-ratio = –2.55) to –0.042 (z-ratio = –2.67) under Specification 3.

between 25 and 43 percent, depending on the dimension under consideration. These monetary evaluations are substantial and more than double in the case of severe deprivation.

The results are potentially relevant for policy makers and sociologists reluctant to rely on heuristics and rules of thumb when evaluating the consequences of deprivation on people's well-being. First, to the extent that individual deprivation frequently extends to different domains, the results are suggestive of bulky well-being losses. Second, income support has been almost exclusively the focus of attention of governments in the attempt to promote more inclusive societies. However, the results suggest that other life domains should not be neglected. We have not found evidence of comparisons in all areas of life, but there is certainly evidence consistent with such phenomena in a number of different non-income fields. This observation warns that the well-being improving scope attributed to income policies may be lower than previously thought. We claim the necessity of a renewed approach where more emphasis should be directed to the other dimensions.

The results presented here should be complemented with further research as new panel data with information on the citizen's access to a broader set of functioning indicators become available. Within a framework of political cooperation—agreeing common objectives and common indicators—effort should be devoted to gather and monitor micro data with explicit indicators of multiple deprivation. A second direction for future research is relaxing our basic assumption of an exogenously-imposed reference group. Some steps toward a better understanding of the endogenous determination of reference groups have been taken recently by directly asking individuals about the direction of their comparisons (Senik, 2009; Clark and Senik, 2010). Allowing for some flexibility in this respect could prove valuable to obtain more accurate and population-specific estimations of potential use for targeted programs.

References

Abel, A., "Equity Premia with Benchmark Levels of Consumption: Closed-Form Results," in Rajnish Mehra (ed.), *Handbook of the Equity Risk Premium*, Elsevier, Amsterdam, 117–57, 2008.

Atkinson, A. B., "Social Exclusion, Poverty and Unemployment," in A. B. Atkinson and J. Hills (eds), *Exclusion, Employment and Opportunity*, CASE/4, Centre for Analysis of Social Exclusion, London School of Economics, 1–20, 1998.

Bellani, L. and C. D'Ambrosio, "Deprivation, Social Exclusion and Subjective Well-Being," *Social Indicator Research*, 104, 67–86, 2010.

Berrebi, Z. M. and J. Silber, "Income Inequality Indices and Deprivation: A Generalization," *Quarterly Journal of Economics*, 100, 807–10, 1985.

Blanchflower, D. and A. Oswald, "Well-Being over Time in Britain and the USA," *Journal of Public Economics*, 88, 1359–86, 2004.

Bossert, W., C. D'Ambrosio, and V. Peragine, "Deprivation and Social Exclusion," *Economica*, 74, 777–803, 2007.

Boyce, C. J., "Understanding Fixed Effects in Human Well-Being," *Journal of Economic Psychology*, 31, 1–16, 2010.

Boyce, C., G. Brown, and S. Moore, "Money and Happiness: Rank of Income, Not Income, Affects Life Satisfaction," *Psychological Science*, 21, 471–75, 2010.

Brown, G., J. Gardner, and A. Oswald, "Does Wage Rank Affect Employees' Well-being?" *Industrial Relations*, 47, 355–89, 2008.

Cacioppo, J., L. C. Hawkley, A. Kalil, M. E. Hughes, L. Waite, and R. A. Thisted, "Happiness and the Invisible Threads of Social Connection: The Chicago Health, Aging and Social Relations Study," in M. Eid and R. J. Larsen (eds), *The Science of Subjective Well-Being*, The Guilford Press, New York, 2008.

Carroll, C., J. Overland, and D. Weil, "Saving and Growth with Habit Formation," *American Economic Review*, 90, 341–55, 2000.
Chakravarty, S. R., "Relative Deprivation and Satisfaction Orderings," *Keio Economic Studies*, 34, 17–31, 1997.
Chakravarty, S. and C. D'Ambrosio, "The Measurement of Social Exclusion," *Review of Income and Wealth*, 52, 377–89, 2006.
Chakravarty, S. R. and P. Moyes, "Individual Welfare, Social Deprivation and Income Taxation," *Economic Theory*, 21, 843–69, 2003.
Clark, A. E. and F. Etilé, "Happy House: Spousal Weight and Individual Well-Being," *Journal of Health Economics*, 30, 1124–36, 2011.
Clark, A. E. and O. Lelkes, "Let Us Pray: Religious Interactions in Life Satisfaction," Paris School of Economics, Mimeo, 2009.
Clark, A. E. and A. Oswald, "Satisfaction and Comparison Income," *Journal of Public Economics*, 61, 359–81, 1996.
Clark, A. E. and C. Senik, "Who Compares to Whom? The Anatomy of Income Comparisons in Europe," *Economic Journal*, 120, 573–94, 2010.
Clark, A. E. and S. Wu, "Objective Confirmation of Subjective Measures of Human Well-Being: Evidence from the USA," *Science*, 327, 576–79, 2010.
Clark, A. E., E. Diener, Y. Georgellis, and R. E. Lucas, "Lags and Leads in Life Satisfaction: A Test of the Baseline Hypothesis," *Economic Journal*, 118, 222–43, 2008.
Clark, A. E., N. Kristensen and N. Westergaard-Nielsen, "Economic Satisfaction and Income Rank in Small Neighbourhoods," *Journal of the European Economic Association*, 7, 519–27, 2009.
Costa, P. T. and R. R. McCrae, "Looking Backward: Changes in the Mean Levels of Personality Traits from 80 to 12," in D. Cervone and W. Mischel (eds), *Advances in Personality Science*, Guilford Press, New York, 219–37, 2002.
D'Ambrosio, C. and J. R., Frick, "Income Satisfaction and Relative Deprivation: An Empirical Link," *Social Indicators Research*, 81, 497–519, 2007.
Danner, D., D. A. Snowdon, and W. V. Friesen, "Positive Emotions in Early Life and Longevity: Findings from the Nun Study," *Journal of Personality and Social Psychology*, 80, 804–13, 2001.
Dekkers, G., "Poverty, Dualisation and the Digital Divide," in Bart Cammaerts, Leo Van Audenhove, Gert Nulens, and Caroline Pauwels (eds), *Beyond the Digital Divide*, VUB-Press, Brussels, 2002.
Diener, E. and M. Chan, "Happy People Live Longer: Subjective Well-Being Contributes to Health and Longevity," *Health and Well-Being*, 3, 1–43, 2011.
Diener, E. and R. Lucas, "Personality and Subjective Well-Being," in D. Kahneman, E. Diener and N. Schwarz (eds), *Well-Being: The Foundations of Hedonic Psychology*, Sage, New York, 1999.
Di Tella, R. and R. MacCulloch, "Some Uses of Happiness Data in Economics," *Journal of Economic Perspectives*, 20, 25–46, 2003.
Di Tella, R., R. MacCulloch, and A. Oswald, "The Macroeconomics of Happiness," *Review of Economics and Statistics*, 85, 809–27, 2003.
European Commission, *Portfolio of Overarching Indicators and Streamlined Social Inclusion, Pensions, and Health Portfolios, April 2008 Update*, Employment, Social Affairs and Equal Opportunities DG, Social Protection and Social Integration, Social and Demography Analysis, Brussels, 2008.
Eurostat, *European Social Statistics. Income, Poverty and Social Exclusion*, Theme 3, Population and Social Conditions, Luxembourg, 2000.
Ferrer-i-Carbonell, A., "Income and Well-Being: An Empirical Analysis of the Comparison Income Effect," *Journal of Public Economics*, 89, 997–1019, 2005.
Ferrer-i-Carbonell, A. and P. Frijters, "How Important is Methodology for the Estimates of the Determinants of Happiness?" *Economic Journal*, 114, 641–59, 2004.
Frey, B., C. Benesch and A. Stutzer, "Does Watching TV Make Us Happy?" *Journal of Economic Psychology*, 28, 283–313, 2007.
Fuhrer, J. C., "Habit Formation in Consumption and its Implications for Monetary Policy Models," *American Economic Review*, 90, 367–90, 2000.
Fujita, F., "The Frequency of Social Comparison and Its Relation to Subjective Well-Being," in M. Eid and R. J. Larsen (eds), *The Science of Subjective Well-Being*, The Guilford Press, New York, 2008.
Gailly, B. and P. Hausman, "Désavantages Relatifs à une Measure Objective de la Pauvreté," in G. Sarpellon (ed.), *Understanding Poverty*, F. Angeli, Milan, 1984.
Graham, C., A. Eggers, and S. Sukhtankar, "Does Happiness Pay? An Exploration Based on Panel Data from Russia," *Journal of Economic Behavior and Organization*, 55, 319–42, 2004.
Haisken-DeNew, J. P. and M. Sinning, "Social Deprivation and Exclusion of Immigrants in Germany," *Review of Income and Wealth*, 56, 715–33, 2010.

Headey, B., R. Muffels, and M. Wooden, "Money Doesn't Buy Happiness: Or Does It? A Reassessment Based on the Combined Effects of Wealth, Income and Consumption," *Social Indicators Research*, 87, 65–82, 2011.
Helliwell, J. F. and H. Huang, "How's the Job? Well-Being and Social Capital in the Workplace," *Industrial and Labor Relations Review*, 63, 205–27, 2010.
Judge, T., D. Heller, and M. K. Mount, "Five-Factor Model of Personality and Job Satisfaction: A Meta-Analysis," *Journal of Applied Psychology*, 87, 530–41, 2002.
Kingdon, G. and J. Knight, "Community, Comparisons and Subjective Well-Being in a Divided Society," *Journal of Economic Behaviour and Organization*, 64, 69–90, 2007.
Lockwood, P., "Could It Happen to You? Predicting the Impact of Downward Comparisons on the Self," *Journal of Personality and Social Psychology*, 82, 343–58, 2002.
Luttmer, E., "Neighbours as Negatives: Relative Earnings and Well-Being," *Quarterly Journal of Economics*, 120, 963–1002, 2005.
Lyubomirsky, S., K. L. Tucker, and F. Kasri, "Responses to Hedonically Conflicting Social Comparisons: Comparing Happy and Unhappy People," *European Journal of Social Psychology*, 31, 511–35, 2001.
Mundlak, Y., "On the Pooling of Time Series and Cross-Section Data," *Econometrica*, 46, 69–85, 1978.
Nolan, B. and C. Whelan, *Poverty and Deprivation in Europe*, Oxford University Press, Oxford, 2011.
Papadopoulos, F. and P. Tsakloglou, "Identifying Population Groups at High Risk of Social Exclusion: Evidence from the ECHP," in R. Muffels, P. Tsakloglou, and D. Mayes (eds), *Social Exclusion in European Welfare States*, Edward Elgar, Cheltenham, 135–69, 2002.
Powdthavee, N., "Ill-Health as a Household Norm: Evidence from Other People's Health Problems," *Social Science & Medicine*, 68, 251–59, 2008.
———, "How Much Does Money Really Matter? Estimating the Causal Effects of Income on Happiness," *Empirical Economics*, 39, 77–92, 2010a.
———, "How Important is Rank to Individual Perception of Economic Standing? A Within-Community Analysis," *Journal of Economic Inequality*, 7, 225–48, 2010b.
Roberts, B. W. and W. F. DelVecchio, "The Rank-Order Consistency of Personality from Childhood to Old Age: A Quantitative Review of Longitudinal Studies," *Psychological Bulletin*, 126, 3–25, 2000.
Runciman, W. G., *Relative Deprivation and Social Justice*, Routledge, London, 1966.
Sen, A. K., "Social Exclusion and Economic Measurement," Paper presented at the 25th General Conference of the International Association for Research in Income and Wealth, Cambridge, 1998.
Senik, C., "Direct Evidence on Income Comparisons and their Welfare Effects," *Journal of Economic Behavior and Organization*, 72, 408–24, 2009.
Stutzer, A. and B. Frey, "Does Marriage Make People Happy, or Do Happy People Get Married?" *Journal of Socio-Economics*, 35, 326–47, 2006.
Van den Berg, B. and A. Ferrer-i-Carbonell, "Monetary Valuation of Informal Care: The Well-Being Valuation Method," *Health Economics*, 16, 1227–44, 2007.
van Praag, B. M. S. and A. Ferrer-i-Carbonell, *Happiness Quantified: A Satisfaction Calculus Approach*, revised edition, Oxford University Press, New York, 2008.
———, "Happiness Economics: A New Road to Measuring and Comparing Happiness," *Foundation and Trends in Microeconomics*, 6, 1–97, 2010.
Van der Zee, K., F. Oldersma, B. Buunk, and D. Bos, "Social Comparison Preferences Among Cancer Patients as Related to Neuroticism and Social Comparison Orientations," *Journal of Personality and Social Psychology*, 75, 801–10, 1998.
Verhaest, D. and E. Omey, "Objective Over-Education and Worker Well-Being: A Shadow Price Approach," *Journal of Economic Psychology*, 30, 469–81, 2009.
Whelan, C. and B. Maître, "New and Old Social Risks: Life Cycle and Social Class Perspectives on Social Exclusion in Ireland," *Economic and Social Review*, 39, 131–56, 2008.
Wood, J. V. and K. Van der Zee, "Social Comparisons Among Cancer Patients: Under What Conditions Are Comparisons Upward and Downward?" in B. P. Buunk and F. X. Gibbons (eds), *Health, Coping, and Well-Being: Perspectives from Social Comparison Theory*, Erlbaum, Hillsdale, NJ, 299–328, 1997.
Yitzhaki, S., "Relative Deprivation and the Gini Coefficient," *Quarterly Journal of Economics*, 93, 321–24, 1979.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix: BFI and LOC items