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Happiness, equivalent incomes, and respect for individual preferences*

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Abstract

In this paper, we study interpersonal comparisons of well-being. We show that using subjective well-being (SWB) levels can be in conflict with individuals' judgments about their own lives. We propose therefore an alternative metric of well-being in terms of equivalent incomes that does respect individual preferences. We show how SWB surveys can be used to derive the ordinal information about preferences that is needed to calculate these equivalent incomes. We illustrate our approach with panel data from the Russia Longitudinal Monitoring Survey (RLMS-HSE) for the period 1995-2003 and we compare the results for equivalent income with the results for other metrics of well-being such as expenditures and SWB. We find that different metrics identify different groups as the worst-off.

Keywords: happiness, life satisfaction, preferences, interpersonal comparisons, equivalent income.

JEL Classification: D60, D71.

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“For nothing is more certain, than that despair has almost the same effect on us with enjoyment, and that we are no sooner acquainted with the impossibility of satisfying any desire, than the desire itself vanishes.”

D. Hume, *A Treatise of Human Nature*

1 Introduction

Recently a booming literature has yielded important insights into the determinants of happiness and life satisfaction, as measured by the answers to simple survey questions. A particularly interesting finding is the importance of non-monetary variables (such as health, relative status and job satisfaction) for subjective well-being (SWB).¹ While many authors have restricted themselves to a descriptive analysis of the determinants of SWB, others have explicitly or implicitly used SWB surveys to derive policy conclusions. First, SWB answers have been used to derive information about *ordinal* preferences, i.e. marginal rates of substitution and willingness-to-pay.² Second, SWB scores have also been directly interpreted as *cardinal and interpersonally comparable* measures of utility.³ Traditional advocates of the ordinal approach (such as Robbins and Samuelson) argued that interpersonal comparisons of utility had no sound empirical basis, and that subjective utility could therefore not be an adequate basis for welfare evaluations. Yet, the mass of accumulated data on SWB reveals a remarkable regularity in human psychology. So, if utility can be measured after all, why not go “back to Bentham” (Kahneman et al. 1997) and use it as the metric of individual well-being?

The economic tradition has usually accepted as a guiding principle that the evaluation of an individual’s well-being should respect her own preferences on what makes a good life. We refer to this principle as “individual sovereignty”. Proponents of the SWB approach have argued that it respects individual preferences and, moreover, that it may even be the only approach to do so (see, Kaplow and Shavell 2001 and Layard 2005, for instance). In this paper we will investigate this claim.⁴

¹There are important conceptual differences between “happiness” and “life satisfaction”, to which we will return. The distinction is not always made in the empirical literature, however, and we will use the generic abbreviation “SWB” to include both happiness and life satisfaction.

²See, e.g., Clark and Oswald 2002, Frey et al. 2004, Lüchinger and Raschky 2008, Van Praag and Baarsma 2005, Van Praag and Ferrer-i-Carbonell 2007, Welsch 2009, and Deaton et al. 2010.

³See, e.g., Bok 2010, Di Tella and MacCulloch 2006, Kahneman et al. 2004, Kahneman and Sugden 2005, Layard 2005, and Layard et al. 2008.

⁴Our approach is in the wake of the literature which interrogates the implications of happiness studies for welfare economics (Adler and Posner 2008, Barrota 2008, Burchardt 2006, Frey and Stutzer 2007, Hausman 2010, Nussbaum 2008, and Schokkaert 2007). In these studies there is some echo of the earlier

It is important to be explicit about what we understand by “individual preferences”. We follow the literature in welfare economics and social choice that (at least since Arrow, 1951) has assumed that individuals have preferences over the various aspects of their life (including its non-monetary dimensions) and that they rely on these preferences when they evaluate their situation in a detached way or compare it to the situation of others. Of course, these “ideal” preferences may change over time and are likely to be different for different individuals. Moreover, these “ideal” preferences are obviously not always revealed in actual choice behavior, as the latter may be influenced by informational imperfections or driven by imperfect decision heuristics. Our interpretation of “preferences” differs therefore from another stream in the literature that defines “preferences” as the ordering that is revealed in individual choice behavior. In an extreme version of this latter approach it is even meaningless to talk about preferences when we cannot observe choices. The recent literature on behavioral economics has yielded important insights in the relationship between “ideal” preferences, “revealed” preferences, choice behavior and subjective feelings.⁵ In this paper we will maintain the assumption that individuals have consistent and complete preferences over the various aspects of their lives, that reflect their informed judgments, and are not necessarily revealed in their choice behavior. When we use the term “preferences” in this paper, this is the concept we are referring to. In our view, “individual sovereignty” requires to respect these informed judgments. We are aware that this may be seen as an optimistic position. It is indeed possible to argue that the basic decision problems that have been described in the behavioral economics literature also apply to our notion of “ideal preferences”, in that the latter are unavoidably incomplete and/or unstable. Addressing this challenge requires adapting both our theory of interpersonal comparisons and its empirical implementation. One possibility is to follow up on Bernheim (2009)’s suggestion to work explicitly with incomplete preferences. Incompleteness may be a real characteristic of preferences, or it may reflect the limited knowledge of the analyst. A companion paper examines how to do adapt the theory (Fleurbaey and Schokkaert 2013).

We argue that SWB measures respect a weak version of individual sovereignty. Unlike objective indicators of well-being, SWB measures do respect individual preferences in intrapersonal comparisons of life situations. This justifies their use as a method to derive information about ordinal preferences such as the marginal rates of substitution between various dimensions of life. However, due to phenomena of shifting aspirations, adaptation and other related scaling problems, SWB measures do not satisfy a stronger version of

debate about subjective welfarism initiated by Sen (1985).

⁵See, e.g., Bernheim 2009, Dolan and Kahneman 2008, Kahneman and Thaler 2006, Köszegi and Rabin 2008, and Loewenstein and Ubel 2008 for different positions in this debate.

individual sovereignty that requires respect for the preferences unanimously held by all concerned individuals. We argue that this stronger version of individual sovereignty is in fact a necessary requirement to make meaningful interpersonal comparisons of well-being, which are an essential ingredient for the evaluation of policies and social alternatives.

We then introduce an alternative metric of well-being that does respect the stronger version of individual sovereignty when preferences coincide and also provides justified interpersonal comparisons when preferences differ. We call this metric “equivalent income”. The equivalent income of an individual is the hypothetical income that, if combined with the best possible value on all non-income dimensions, would place the individual in a situation that she finds equally good as her initial situation. The “best possible value” is derived from the preferences of the individuals themselves. Equivalent income is closely related to the traditional concept of money-metric utility (King 1983, Samuelson and Swamy 1974) and provides an interpersonally comparable cardinalization of the ordinal preferences of each individual.

Let us make an important remark at the outset. We side with Robbins (1932) and Rawls (1982) that constructing a method for interpersonal comparisons, for the purpose of social and policy evaluation, is inherently a value-laden exercise. Ethical questions cannot be avoided as interpersonal comparisons deal with determining who is better-off and worse-off in a sense that may influence priorities in social policy. This is true for any metric of well-being, including the traditional ones such as incomes and expenditures or the SWB scores themselves. Here, we seek to construct a metric of well-being that respects individual preferences. Hence, whether one prefers equivalent income as metric of individual well-being or not will depend ultimately on whether and how one wants to respect individual preferences.

While SWB measures can be directly taken from surveys, information on ordinal preferences is necessary to make the concept of equivalent income operational. Unfortunately, this information is typically not available in real-world data sets and has to be obtained by other methods. Yet, we show how ordinal preferences can be derived from SWB surveys. We illustrate the proposed methodology with individual panel data from the Russia Longitudinal Monitoring Survey (RLMS-HSE) for the period 1995-2003. We compare equivalent income as metric of well-being with standard objective and subjective metrics such as expenditures and life satisfaction. We find that the correlation between the different metrics is not high. Our empirical results highlight furthermore the importance of the choice of the set of relevant dimensions.

The paper is structured as follows. In Section 2 we study to what extent SWB scores respect individual preferences. We find that they only partially do so. We propose therefore equivalent income as an alternative metric of well-being that fully respects

preferences. Section 3 examines how equivalent income can be operationalized and what role SWB surveys can play therein. In Section 4 we illustrate the approach with Russian data. Section 5 concludes.

2 Satisfaction, happiness and preferences

Let ℓ_i denote the vector of m aspects of life that may matter to individual i . In traditional microeconomic theory ℓ_i could be interpreted as a vector of goods. In Sen's (1985) terminology, ℓ_i would be the vector of functionings. Examples are consumption, health, longevity, leisure, status, and job characteristics. We assume that each individual i has a continuous preference ordering R_i over the vectors ℓ_i , which reflects her informed judgment about what makes a life good or bad: we write $\ell_i R_i \ell'_i$ if i weakly prefers the life described by ℓ_i to the life described by ℓ'_i . Let $\ell_i P_i \ell'_i$ denote strict preference and $\ell_i I_i \ell'_i$ denote indifference.

When individuals express their overall satisfaction with life, i.e. with the vector ℓ_i , this judgment follows a “satisfaction function” $S_i(\ell_i)$. We assume consistency between satisfaction judgments and preferences, i.e. that the S_i function is a representation of the preference ordering:

Consistency Assumption $S_i(\ell_i) \geq S_i(\ell'_i)$ if and only if $\ell_i R_i \ell'_i$.

If this assumption were not satisfied, SWB surveys would not give us any information on preferences. It is instructive to see how it relates to the distinction that is often made between “experienced utility” and “decision utility” (Gruber and Mullainathan 2005, Kahneman et al. 1997, Kahneman and Sugden 2005, Layard 2005, Stutzer and Frey 2008). Decision utility is linked to preferences and prospective choices, experienced utility would be better reflected in survey questions that are answered ex post. In the light of our growing knowledge about behavioural imperfections, experienced utility and decision utility may be different and the former will not necessarily reflect “revealed preferences”. In fact, it has been argued that experienced utility is a better metric of well-being and that the use of revealed preferences may be misleading. To some extent, we share this suspicion towards a narrow interpretation of revealed preferences. As mentioned before, in our interpretation, the relevant preferences R about life dimensions involve correct information and proper deliberation and are therefore not always revealed in actual choice behaviour (governed by decision utility). If satisfaction surveys capture experienced utility, they may provide data about informed preferences R which are more relevant than direct observations of behaviour.

The consistency assumption states that SWB answers reflect ordinal preferences of individuals. Of course, ordinal preferences do not provide a grade in any given scale. Satisfaction judgments, on the contrary, do imply a particular scaling as they pick one possible “utility” function out of the set of all positive monotonic transformations representing the same preference ordering. This scaling will reflect comparisons with reference situations such as the worst possible and the best possible (as prompted by some questionnaires), the situation one expected at some earlier stage in life (aspirations or expectations), the situation of one’s parents, the situation of one’s peers, the situation of fellow citizens...⁶ We call all such components of the judgment the scaling factors. Obviously, these scaling factors may differ across individuals and change over time. If one uses the SWB scores directly as cardinal and interpersonally comparable metrics of well-being, one goes beyond the consistency assumption and one accepts in addition that the specific cardinalization that is implied by the SWB question, is adequate from a normative point of view.

In order to make the analysis more transparent we will write that there is a general satisfaction function $\bar{S}$ such that for every i ,

$$\bar{S}(\ell_i, R_i, s_i) = S_i(\ell_i),$$

where s_i denote the scaling factors which, by definition, are supposed not to be direct objects of preferences. The space in which ℓ_i is defined should be broad in order to encompass all dimensions of life that *may* matter to individuals. Then R_i selects the relevant dimensions that *actually* matter to i , and s_i contains all additional factors that influence the calibration of a satisfaction answer without mattering directly to the individual. It is important to be clear about the interpretation of s_i . Some of the examples of scaling factors listed above may actually be direct objects of preferences for some individuals. Consider the example of one’s relative ranking in one’s peer group. If this ranking matters to individuals intrinsically, it should be included in ℓ_i . If changes in the peer group change the preferences of individuals over various functionings, this phenomenon will be captured by changes in R_i . By definition, the scaling factors s_i , that are included in $\bar{S}(\ell_i, R_i, s_i)$, only relate to factors that influence how the individuals scale their answer to a satisfaction question, i.e. they influence the cardinalization of the preferences and not their ordinal characteristics. While the distinction is clear in theory, it is not always easy to make it in empirical applications. We discuss this further in later sections.

Note that the consistency assumption is hard to test empirically since it is difficult

⁶See, e.g., Frey and Stutzer (2002), Van Praag and Ferrer-i-Carbonell (2007), Clark and Oswald (2002), Clark et al. (2008), Steffel and Oppenheimer (2009). A theoretical analysis can be found in Kimball and Willis (2006). See also Fleurbaey and Blanchet (2013) for a more extensive discussion.

to make sure that preferences and scaling factors remain fixed when an individual moves from ℓ_i to ℓ'_i . We see it as a requirement on the measurement of $S_i(\ell_i)$, in other words we assume that the satisfaction question is sufficiently well crafted so that the answers reflect the individual's views about what is good in life, as embodied in R_i .

Individual i 's situation is completely described by the triplet (ℓ_i, R_i, s_i) , that is the vector of life dimensions ℓ_i , the preference ordering R_i , and the scaling factors s_i . A method of interpersonal comparisons must be able to rank such triplets. We therefore seek a complete ordering over all possible (ℓ_i, R_i, s_i) . We will call this the well-being ordering. As emphasized before, picking a well-being ordering involves a normative choice. As impartiality of the evaluation seems warranted from a normative point of view, we drop the subscript i and ignore the identity of the individuals enjoying the situation (ℓ, R, s) . In this paper we are interested in the implications of imposing the principle of individual sovereignty on this ordering of triplets (ℓ, R, s) .

Of course, for policy evaluation one needs not just an ordering of individual situations but an ordering of social situations. In this paper we focus on the issue of interpersonal comparisons for three reasons. First, it is a necessary step in the construction of a criterion for social evaluation. As it turns out, the individual indexes that we propose can be easily fed into a social welfare function, so that our paper is immediately relevant to social evaluation as well, although our empirical illustration does not dwell on this point.⁷ Second, we believe that developing an explicit theory of interpersonal comparisons that is distinct from the theory of social choice would make welfare economics more transparent. Sen's work on capabilities (initiated in Sen 1985) has been formulated as a theory of interpersonal comparisons, and the axioms discussed in this paper are related to his. Third, our empirical application focuses on the identification of the worst-off in the population, and for such an application one only needs a ranking of individual situations, not a ranking of social situations.

2.1 Emotions and cognitions

In their interpretation of SWB, psychologists draw an essential distinction between affects (feelings, emotions) and cognitions (evaluations, judgments) (Diener 1994, Diener et al. 1999, Russell, 1980). In the cognitive part, individuals cast a judgment over their life. Positive and negative affects (such as pleasure, joy, pain, sorrow, love, shame) flow constantly when individuals are awake. Although they may matter a great deal to individuals,

⁷The theory of social choice has recently developed criteria that incorporate considerations of fairness and ultimately involve interpersonal comparisons that are different from those advocated in this paper but belong to the same general "equivalence" approach (see Fleurbaey and Maniquet 2011 for a monograph on this approach).

they are not the only consideration entering the cognitive assessment of life (Benjamin et al. 2012). In the formal notation of our model, affects are aspects of life over which individuals may have preferences and therefore they are best seen as components of the vector ℓ_i .⁸ The satisfaction judgment an individual may cast on his life is a representation of his preferences and coincides with $S_i(\ell_i)$.

The distinction between affects and cognitions is relevant for welfare analysis. It is indeed common to distinguish two variants of welfarism. “Hedonic welfarism” bases the evaluation of individual well-being on feelings of happiness, i.e. on the values of some components of ℓ_i . This position is defended, e.g., by Kahneman et al. (2004, 2006). “Subjective welfarism”, on the other hand, starts from the life satisfaction judgments S_i .

2.2 Respecting preferences in interpersonal comparisons

The most natural expression of individual sovereignty is that the well-being ordering should respect R for comparisons of well-being concerning only one individual at one moment in time. We call this the “personal-preference principle”:⁹

Personal-Preference Principle: (ℓ, R, s) is at least as good (for the well-being ordering) as (ℓ', R, s) if $\ell R \ell'$ and strictly better if $\ell P \ell'$.

Although indeed very basic, the personal-preference principle is not satisfied by “objective” approaches that rank (ℓ, R, s) independently of the individual’s R and s , such as the approaches proposed by Rawls (for whom the weights should reflect the average preferences of the worst-off group) or Sen (for whom a single set of weights should be collectively decided in a democratic forum). Traditional multidimensional inequality measures also belong to this “objective” family in that they do not take into account preference differences.¹⁰ The personal-preference principle is not satisfied by the hedonic approach either. Hedonic welfarism is paternalistic since it implicitly imposes that the only thing that individuals should ultimately care about is their own feelings, i.e. a subset of ℓ_i . Objective and hedonic approaches fail to respect the diversity of individual evaluations about what is good in life. Compared to these alternatives, subjective welfarism is a move in the direction of individual sovereignty. Indeed, *under the consistency assumption*, the personal-preference principle is satisfied by a metric of well-being directly based on $\bar{S}(\ell, R, s)$.

⁸This view is eloquently defended in Loewenstein and Ubel (2008) and Kimball and Willis (2006). Becker and Rayo (2008) also propose to model happiness as one argument among others of individual “utility”.

⁹Universal quantifiers are omitted whenever the meaning of the axiom is clear.

¹⁰See Decancq and Lugo (2012) for an application of such inequality measures to the same data that will also be analysed in the empirical sections of this paper.

The personal-preference principle does not exhaust the implications of individual sovereignty, however. Consider two triplets (ℓ, R, s) and (ℓ', R, s') such that $\ell P \ell'$ but $\bar{S}(\ell, R, s) \leq \bar{S}(\ell', R, s')$. This configuration can occur for a given individual with stable preferences and a shift in scaling factors over time or for a pair of individuals who share the same preferences but have different scaling factors. In both situations, there is a preference for ℓ against ℓ' , but the situation (ℓ', R, s') exhibits a greater or equal level of satisfaction. There are many examples of scaling shifts and differences in the happiness literature. Individuals who have lost limbs may, after adaptation, recover a good satisfaction score but still express a strong aversion to disability (Frederick and Loewenstein 1999, Loewenstein and Ubel 2008). Midwesterners and Californians may have similar satisfaction levels and nevertheless express a strong preference for California, all other things equal (Schkade and Kahneman 1998). HIV prevalence has little effect on Africans' life satisfaction at the country level (Deaton 2008) – yet, individuals clearly prefer to avoid HIV. While material comfort and affluence appear important in casual observation of people's values and in cross section or short run regressions of life satisfaction (Blanchflower and Oswald 2004, Deaton 2008), happiness and satisfaction scores appear quite stable in the long run in some countries despite the large growth in real incomes (Easterlin 1995, Oswald 1997, Sacks et al. 2010).¹¹ Graham (2009) insists that the diversity of scaling factors across individuals generates “happy peasants and miserable millionaires”. All these examples can be understood as cases of shifts or differences in scaling factors with common preferences in the background.

If there is a clash between ordering individuals on the basis of their subjective satisfaction and their common preferences, which of the two approaches do we follow? Do we give priority to preferences or to satisfaction? In this paper we explore the former track. In our view, the happy poor should be considered to be at a lower level of well-being than the miserable millionaire and losing a limb or getting HIV leads to a lower level of well-being, even if satisfaction with life is not affected. These are of course normative judgments but it seems obvious that taking individual sovereignty seriously implies giving priority to preferences and not to satisfaction levels. The idea of individual sovereignty is embodied in the following principle which logically strengthens the personal-preference principle:

Same-Preference Principle: (ℓ, R, s) is at least as good as (ℓ', R, s') if $\ell R \ell'$ and strictly better if $\ell P \ell'$.

¹¹Sacks et al. (2010) observe a positive relation between GDP per capita and satisfaction, on average over a large sample of countries, but for a subsample of countries such as the US, this relation is not observed.

The same-preference principle states that common preferences should be respected and that differences in the scaling factors are disregarded in the construction of the well-being ordering.¹² It is not satisfied by satisfaction answers. A fortiori, it is not satisfied by hedonic measures either. We consider the same-preference principle a key contribution to the theory of interpersonal well-being comparisons if one aims at respecting preferences. It is usually thought that individual sovereignty has to do with intrapersonal comparisons only. The same-preference principle shows that respecting preferences also has strong implications for interpersonal comparisons. Accepting it means that one should not use SWB scores as a metric of well-being for evaluating distributional policies. We have to look for an alternative.

2.3 When preferences differ

While the same-preference principle is sufficient to discard SWB scores as an attractive approach to interpersonal comparisons of well-being, it remains quite limited because it only deals with individuals sharing the same preferences. If preferences are the same, we can rank situations on the basis of the common R . What are the implications of individual sovereignty if individuals have different preferences?

At first sight a natural starting point could be the following principle:¹³

Dominance Principle: (ℓ', R', s') is at least as good as (ℓ'', R'', s'') if $\ell' R \ell''$ for all R , and strictly better if $\ell' P \ell''$ for all R .

This principle states that if a situation ℓ' is preferred to a situation ℓ'' for *all* admissible individual preference orderings (and hence also by all individuals in society), then we consider the individual in ℓ' to be better off than the individual in ℓ'' . However – perhaps surprisingly – the dominance principle is *not* a natural extension of the personal-preference principle, it is even incompatible with it. By relying on unanimity over all preference orderings, it does not cater to the diversity of individual preferences. Indeed, it implies that (ℓ, R, s) is as good as (ℓ, R', s') for all ℓ and all R, R', s, s' , so that preferences play no role in the evaluation of (ℓ, R, s) .

Even the weak requirement that (ℓ', R', s') must be better than (ℓ'', R'', s'') whenever $\ell' \gg \ell''$ and preferences are monotonic is incompatible with the personal-preference principle. This is shown by the following example. Take $\ell_i, \ell_j, \ell'_i, \ell'_j$ and R_i, R_j such

¹²When some scaling factors, such as position in one's peer group, are also part of ℓ because they matter intrinsically to the individual, the same-preference principle remains just as appealing, because it cautiously makes sure that the preference ordering over ℓ is respected.

¹³This axiom corresponds to Sen's (1985) "intersection principle". On this issue, see in particular Brun and Tungodden (2004).

that $\ell_i \gg \ell_j, \ell'_i \ll \ell'_j, \ell'_i P_i \ell_i$, and $\ell_j P_j \ell'_j$. The personal-preference principle implies that (ℓ'_i, R_i, S_i) is better (ℓ_i, R_i, S_i) and (ℓ_j, R_j, S_j) is better than (ℓ'_j, R_j, S_j) while the dominance principle implies that (ℓ_i, R_i, S_i) is better than (ℓ_j, R_j, S_j) and (ℓ'_j, R_j, S_j) is better than (ℓ'_i, R_i, S_i) . By transitivity, this is impossible.¹⁴

This conflict between the dominance principle and the principle of individual sovereignty, as formulated in the personal preference principle, is very fundamental. When we want to move forward, there are two directions. One route, which has been explored, e.g., by Sprumont (2012), is to relax the personal preference principle and keep to dominance. We follow the other possible route and look for a weakening of the dominance principle. In our view, a rich and democratic society cannot afford not to take into account interindividual differences about what is a good life in its (re)distributive policies – but we are well aware that this is a normative position and that other positions can be (and have been) defended. However, even if one takes the opposite position, it remains interesting to analyse the implications of respecting individual sovereignty.¹⁵

We propose the following approach that applies to a particular specification of the model. We retain from the dominance principle the basic insight that in *some* situations the well-being evaluation may be independent of preferences. However, from the discussion above, it follows that in order to satisfy the personal preference principle, these situations have to be defined carefully. Suppose that $\ell = (y, q)$, where $y \in \mathbb{R}_+$ is a measure of real income (or expenditures) and q is a vector describing various aspects of non-market quality of life, such as status, health, quality of the environment. For any given preference ordering R , for any fixed value of y , there is an optimal vector of quality of life $q^*(y; R)$ that reflects the preferences over q given y . We propose to consider that when an individual has more income than another and each of them enjoys his or her optimal vector q^* , then the individual with more income reaches a higher level of well-being. Let us first formally state the principle and then further discuss its rationale.¹⁶

Weak Dominance Principle: $((y, q^*(y; R)), R, s)$ is at least as good as $((y', q^*(y'; R')), R', s')$ if $y \geq y'$, and strictly better if $y > y'$.

¹⁴Note that only acyclicity is used here. Therefore there is no interesting way of avoiding this problem by relaxing transitivity.

¹⁵One referee notes that, “at least for detecting the worst-off”, priority should be given to the dominance principle as this is a way to “objectivize the target group”. This argument is debatable, as is argued in Decancq et al. (2014). Moreover, in this paper, we are interested in formulating a general concept of well-being that can be applied to everybody in society and does not have “detecting the worst-off” as its only objective. Our empirical results in the following sections focus indeed on the individuals at the bottom of the well-being scale, but this is for illustrative purposes only.

¹⁶The definition of $q^*(y; R)$ is not obvious for life dimensions that are unbounded and for which preferences are monotonic. We assume that in this case the “optimal” value corresponds to the top values that are observed in society. The normative reasoning that follows remains applicable in that case too.

Observe that $q^*(y; R)$ need not dominate $q^*(y'; R')$ physically, but what is important is that individual preferences are respected. The weak dominance principle is therefore not logically weaker than the dominance principle, but it deserves to be called that way because it restricts the application of dominance to special situations. It remains a dominance principle in the sense that it prefers a situation of greater income combined with the optimal quality of life independently of the preferences (even if the meaning of an optimal q may depend on preferences). To understand better the rationale for focusing on a situation where the two individuals reach an “optimal” level for the non-income dimensions, consider a simple example where the two individuals have monotonic preferences over only two life dimensions, income and health. One could think that if two individuals have the same value for one dimension, this would allow us to base the well-being ordering on their positions on the other dimension. This is not always clear, however. Imagine two individuals such that one has slightly more income than the other, but both have the same poor health. It is not obvious that the richer individual is better-off than the other when it happens that he cares more about health and would be willing to make a great sacrifice of income if this could alleviate his health problems. In one specific case, however, it seems ethically acceptable to compare the well-being of the individuals in terms of their income, independently of their preferences: when both individuals are perfectly healthy. This is the basic intuition that is captured by the weak dominance principle. One may ask why income is singled out in the principle rather than another dimension. This is, admittedly, more than a mere convenience. We do not claim that the weak dominance principle thus formulated is not debatable. What is important, however, is that it is compatible with the personal-preference principle and allows the derivation of a metric of individual well-being that respects individual sovereignty.

It is easily proved that combining the personal-preference principle and the weak dominance principle characterizes the well-being ordering that compares individuals in terms of equivalent incomes, computed as the solution y^* to the equation

$$(y, q) I (y^*, q^*(y^*; R)), \quad (1)$$

i.e., as the level of income that would give the same satisfaction as the actual situation if combined with the optimal quality of life.

Let us first prove this claim. By the personal-preference principle, if $(y, q) I (y^*, q^*(y^*; R))$ and $(y', q') I (y'^*, q^*(y'^*; R'))$, then $((y, q), R, s)$ is at least as good as $((y', q'), R', s')$ if and only if $((y^*, q^*(y^*; R)), R, s)$ is at least as good as $((y'^*, q^*(y'^*; R')), R', s')$. Whether the latter is true depends, by the weak dominance principle, on whether $y^* \geq y'^*$. This proves the claim.

The equivalent income is always a fraction of y because going from q to q^* is acceptable for some sacrifice on income.¹⁷ It is an intuitive metric of well-being that measures income corrected for the cost of a suboptimal quality of life. In other words, it can be interpreted as a “quality-adjusted” income. Another convenient feature of equivalent income is that it is measured in monetary units, a simple and familiar cardinal scale. It is noteworthy that the same-preference principle is satisfied by it, and therefore is a consequence of the combination of the personal-preference principle and the weak dominance principle.

The notion of equivalent income in eq. (1) is a natural extension of how equivalent incomes have been usually defined in the literature (Fleurbaey 2009). In this traditional approach reference values $\tilde{q}$ for the non-income dimensions are exogenously given¹⁸ and the equivalent income $\tilde{y}$ is the solution to the equation

$$(y, q) I (\tilde{y}, \tilde{q}). \quad (2)$$

Comparing (1) and (2) the similarity is clear. What is different in eq. (1) is, first, that the reference quality of life is made endogenous to the preferences, and, second, that it can change from one individual to another depending on their preferences. In the common situation where all individuals agree about the “best” value for a given variable, the two notions coincide. Health is an important example.

We summarize the main properties of the different approaches in Table 1. The Table illustrates that choosing a specific metric of well-being for interpersonal comparisons is essentially a normative exercise, that should be based on the acceptance of the different principles. There is no final “truth” in this matter. Note that the equivalent income function $y_i^*(y_i, q_i)$ is a representation of the preference ordering R_i , since eq. (1) implies that

$$y_i^*(y_i, q_i) \geq y_i^*(y'_i, q'_i) \text{ if and only if } (y_i, q_i) R_i (y'_i, q'_i).$$

Like the satisfaction function $S_i(\ell_i)$, the function $y_i^*(y_i, q_i)$ is one possible “utility” function out of the set of all positive monotonic transformations representing R_i . This is just

¹⁷Note, however, that the equivalent income, as defined in eq. (1) need not exist. As an example with two dimensions (income and health), consider an individual who suffers so much from his illness that he would be willing to give up more than his actual income in order to reach a situation of perfect health. However, even in such cases, the well-being ordering remains well-defined (see, e.g., Fleurbaey 2005). For simplicity, we do not consider this extension in this paper (also because it turns out not to be relevant in our empirical illustration).

¹⁸The standard equivalent income approach has been criticized for relying on arbitrary reference parameters. We believe that this criticism is unfair, because there are reference parameters everywhere in measures and indexes, and the reference parameters need not be arbitrary. There are situations in which the reference parameter has become so familiar that nobody notices them anymore (equivalence scales for the comparisons of households). Fleurbaey and Maniquet’s (2011) monograph on fair social orderings provides many examples of applications in which the reference is selected on the basis of clear principles.

another way to say that these two approaches satisfy the personal preference principle. When used for interpersonal comparisons, however, their normative implications are quite different: equivalent incomes satisfy the same preference principle, while subjective satisfaction measures do not. We will now show how equivalent incomes can be operationalized and then illustrate the implications of the different metrics with an empirical application.

Table 1: Properties of different approaches

	Hedonic measures	Subjective satisfaction	Equivalent income	Objective measures
Personal preference principle	No	Yes	Yes	No
Same preference principle	No	No	Yes	No
Weak dominance	No	No	Yes	No
Dominance	No	No	No	Yes

3 Estimating equivalent incomes with satisfaction data

To compute equivalent incomes we need information about individual preferences. This information can be collected with the whole range of revealed and stated preferences techniques that have been developed by economists for measuring willingness-to-pay. However, if one accepts the consistency assumption, and assumes that satisfaction answers coincide with $S_i(\ell_i)$ up to a random noise that is uncorrelated with individual characteristics, one can also retrieve information about R_i from SWB surveys. This is just an extension of the common approach that derives marginal rates of substitution from “happiness” equations.

It is standard in the empirical happiness literature to assume a linear form for the satisfaction function S_i :

$$S_{it} = \alpha_i + \mu_t + \gamma_1' \ell_{it} + \gamma_2' Z_{it} + d_{it}, \quad (3)$$

with S_{it} the satisfaction with life expressed by individual i in a survey in period t , ℓ_{it} a vector of variables related to the conditions of life of individual i (typical examples are income or expenditures, health, quality of housing), Z_{it} a vector of personal characteristics (such as gender, ethnicity or being married) that act as scaling variables, d_{it} a disturbance term and (γ_1, γ_2) a vector of coefficients to be estimated. Because unobservable psychological traits like extraversion and emotional stability are likely to influence life

satisfaction and to be correlated with some of the variables in ℓ_{it} and Z_{it} , it is generally considered preferable to work with panel data and to include individual fixed effects α_i and time dummies μ_t in (3).

Although standard in the happiness literature, the linear specification (3) is not satisfactory for our purposes, as it implies that all individuals have identical preferences, characterized by perfect substitutability between the life dimensions ℓ_{it} . When it is not feasible, with the available data, to estimate a highly nonlinear specification of the satisfaction equation which at the same time allows for preference variation, we propose the following compromise specification:

$$S_{it} = \alpha_i + \mu_t + (\beta + \Gamma Z_{it}) \ln(y_{it}) + (\vartheta + \Lambda Z_{it})' q_{it} + \delta' Z_{it} + d_{it}, \quad (4)$$

with $(\beta, \vartheta, \delta)$ a vector of direct effects and Λ and Γ matrices with interaction effects to be estimated.¹⁹ The introduction of interaction terms between the conditioning variables Z_{it} and income y_{it} and other life dimensions q_{it} is a convenient way to model differences and changes in preferences. More specifically, (4) implies that the vector MRS_{it}^{yq} of marginal rates of substitution between income and the other life dimensions is individual and time-dependent:

$$MRS_{it}^{yq} = y_{it} \frac{(\vartheta + \Lambda Z_{it})}{(\beta + \Gamma Z_{it})} \quad (5)$$

Of course, the preference variation remains limited, as we assume individuals with the same values for the conditioning variables Z_{it} to have identical preferences.

On the basis of eq. (4), we can now determine for all individuals the optimal vector of quality of life $q^*(y_i; R_i)$. The equivalent income is then calculated by solving for the level of income y_{it}^* that makes individual i indifferent between the bundle of life dimensions (y_{it}^*, q_i^*) and his actual bundle (y_{it}, q_{it}) . This yields:

$$y_{it}^* = y_{it} \exp \left[\left(\frac{\vartheta + \Lambda Z_{it}}{\beta + \Gamma Z_{it}} \right)' (q_{it} - q_i^*) \right] \quad (6)$$

Note that the conditioning variables Z_{it} only appear in (6) in so far as they influence the preferences. The direct effects of changes in Z_{it} , as captured by the coefficients δ , only shift the level of satisfaction upward or downward, without changing the marginal rates of substitution between the life dimensions. In our theoretical framework such upward and downward shifts (leaving the indifference curves the same) are interpreted as changes in

¹⁹It is common to introduce a logarithmic transformation of Y_{it} in the satisfaction equation to capture some relevant nonlinearities. This also turned out to be the most adequate specification in our data. Yet the argumentation in this section can easily be adapted to other nonlinear transformations of Y_{it} .

scaling, and they are irrelevant for the welfare evaluation. The individual fixed effects α_i , the time variables μ_t and the disturbance terms d_{it} play an analogous role. None of them appears in (6). Given the ordinal nature of the response categories in the satisfaction question, the natural econometric model to estimate (4) is an ordered logit or probit model.

Although the estimation methodology described above is now rather standard in the literature, it is important to acknowledge its limitations if the goal is to obtain good estimates of the population's preferences.

First, with panel data, one cannot simultaneously remove individual fixed effects and derive good information about preferences bearing on life dimensions which are fixed although possibly unequal, like childhood histories or certain bodily characteristics.

Second, by only focusing on a limited list of functionings one ignores other dimensions of life which matter to people, and this is likely to lead us to underestimate inequalities insofar as these other dimensions are positively correlated with those that are recorded.

Third, an even more radical limitation of satisfaction data is that if a variable like education simultaneously affects preferences and scaling, it is impossible to disentangle the two effects and identify preferences.

Fourth, with this empirical methodology we can only measure the average preferences of subgroups defined by socio-demographic characteristics, without being able to capture additional personal variation. However, for the members of the sample, the *average* distance between their estimated preferences and their actual preferences can only go down by allowing for subgroup heterogeneity. Therefore allowing for some (inter-group) preference heterogeneity is better than completely neglecting it.

Finally, the standard happiness-satisfaction questions have been criticized for mixing affective and cognitive aspects. If we want the answers to satisfy the consistency requirement, it is important to use a formulation that transparently requests a cognitive judgment over a well-specified span of life. The existing questionnaires do not satisfy this condition, and allow for the possibility that different respondents understand the life satisfaction question in different ways.

Due to this long list of limitations and difficulties, our empirical application in the next section is only meant to be an illustration of how the distribution of well-being in the population can be different if measured with the equivalent-income approach, as compared to the income and the satisfaction approaches. We expect that better estimation of the population's preferences would confirm the most salient qualitative results even if the quantitative results could be quite different.

4 An illustration: Russia 1995-2003

We illustrate our approach with data from the Russia Longitudinal Monitoring Survey (RLMS-HSE). We introduce the data and show the results for the estimation of the satisfaction equation in the first subsection. These results are very similar to those obtained with the same data by other authors (Frijters et al. 2006, Graham et al. 2004, Ravallion and Lokshin 2001, 2002, Senik 2004, and Zavisca and Hout 2005). In the second subsection we compute equivalent incomes, and examine how their distribution compares with metrics based on satisfaction and on expenditures.

4.1 Life satisfaction in Russia

The Russia Longitudinal Monitoring Survey (RLMS-HSE) is a rich panel of nationally representative surveys. We use the data for the seven waves of 1995, 1996, 1998, 2000, 2001, 2002 and 2003.²⁰ After dropping the observations with inconsistent information we keep an unbalanced sample of 12016 individuals.²¹ In the period 1995-2003, the Russian Federation was an economy in turmoil, witnessing a sharp devaluation of the ruble in 1998. The data therefore show a lot of variation, with many individuals experiencing large (and often exogenous) changes in their living standard. Life satisfaction is measured by the question: “*To what extent are you satisfied with your life in general at the present time?*”, with answers on a five point-scale from “not at all satisfied” to “fully satisfied”. Compared to most other satisfaction studies, a large fraction of the Russian population was “less than satisfied” or “not satisfied” with their life. Descriptive statistics for the variables used in our analysis are given in Table 6, in the appendix. Note that emotions do not appear in the data, therefore we are unable to estimate the weight respondents attribute to emotions in their life evaluations.

The estimation results for the satisfaction equation (4), specified as an ordered logit model, are shown in Table 7, also in the appendix. Standard errors are corrected for clustering at the household level. To incorporate individual fixed effects, we follow the approach proposed by Ferrer-i-Carbonell and Frijters (2004) and applied by Frijters et al. (2004) and Frijters et al. (2006) to German and Russian satisfaction data. While this extension of the original Chamberlain (1980) approach allows to use the available information more efficiently, it is computationally cumbersome. We therefore make use of the approximation proposed by Jones and Schurer (2011).²²

²⁰No survey has been carried out in 1997 and 1999.

²¹Frijters et al. (2006) also work with the unbalanced panel and show that attrition may bias the estimates obtained from the balanced panel.

²²We also estimated our models with the original Chamberlain (1980) approach. The coefficients have

Our results are in line with what is usually found in the literature. All the time-invariant individual characteristics are taken up by the fixed effects. The pattern of the time dummies reflects most probably the general feelings of trust and mistrust in the Russian economy (as suggested by Zavisca and Hout 2005). The nonlinear effect of age is captured by a quadratic term. We introduce the logarithm of household expenditures per consumption unit²³, rather than household income. Income is notoriously difficult to measure, certainly in Russia with its large shadow economy during the considered period. Moreover, expenditures are a better measure of permanent income, the crucial component in our theoretical framework. Expenditures, self-assessed health²⁴ and quality of housing²⁵ have a highly significant positive effect on life satisfaction. The direct effects of being unemployed, of experiencing “wage arrears” and of having obtained higher education are not significant. The “wage arrears” variable captures the (at that time in Russia common) phenomenon that wages were not paid in time.

At this point it is necessary to decide about the list of relevant life dimensions included in ℓ_{it} . Four elements of this vector appear in almost all lists of life dimensions proposed in the literature: expenditures (or income) per consumption unit, health, housing and (un)employment. We include them all in ℓ_i . However, for other variables, it is less clear whether they should be interpreted as life dimensions or as scaling variables. We will therefore focus on a benchmark case, but show in the next subsection also the results of a sensitivity analysis.

For our benchmark computations, we include the variable “wage arrears” in the list of life dimensions, capturing income and job uncertainty. We are more doubtful about

in general the same sign, but, as expected, are estimated less efficiently. Jones and Schurer (2011) report that with their data the results for the full approach and for the simplified approach are very similar. We thank Andrew Jones for sending us the STATA-code to implement the simplified conditional fixed effects ordered logit model.

²³As equivalence scale we use the square root of the number of household members. This equivalence scale is in line with the results of an ordered logit without fixed effects for the pooled sample, in which we could estimate separate coefficients for log expenditures (0.407) and log household size (-0.219). These estimates imply an equivalence scale parameter of 0.558, very close to 0.5.

²⁴To some extent, self-assessed health raises similar issues with respect to the influence of scaling factors as subjective satisfaction (see, e.g., Groot 2000). Yet we follow the common practice in the happiness literature and use the questionnaire answers for “self-assessed health” as if they yielded a cardinal and interpersonally comparable measure.

²⁵The RLMS-HSE-data contain a lot of information on housing characteristics: space in square meters, availability of central heating, hot water, metered gas, sewerage, telephone, video and computer. They also contain information on the price of the house. We first estimated on the pooled data a hedonic price equation, including regional and year dummies ($R^2 = 0.73$, all variables significant with the expected sign). To correct for household size, we then calculated for each individual an index of the housing quality as the value predicted by the hedonic equation after having substituted “equivalized space” for “space”. These computed values for housing quality only change over time if one of the real characteristics of the house changes or if the number of individuals living in the house changes. More information about the estimation procedure and the results is available from the authors on request.

the “occupational prestige” variable. Would this be a functioning or is it better seen as a variable capturing aspirations? We opt for the latter possibility in our benchmark computation, but this is obviously not a straightforward choice to make. The level of education appears as such in many lists of relevant dimensions of life, or it is at least closely related to proposed life dimensions.²⁶ However, it is also reasonable to argue that education has an influence on aspirations. If education influences the frame of reference but is *at the same time* a true life dimension, it is impossible to disentangle these two effects with the available data. In our benchmark choice, we interpret education as a scaling variable. And what about personal family situation (being married, divorced, as married or widowed)? Since we are looking for a concept of well-being for the evaluation of the desirability of redistributive policies, it seems reasonable to focus on the dimensions of life that are the subject of public policies, rather than the life dimensions which are situated in the private sphere. We will therefore treat personal family situation as a conditioning variable in our main analysis, and not as a dimension of life that should be taken into account in the evaluation of living standards. Certainly, one could take the opposite view and argue that “having harmonious personal relations” is a crucial feature of a good life. The fact that these choices are difficult does not at all undermine the usefulness of our general approach. Our method makes it possible to derive a relevant weighting scheme for all possible choices. For the time being we will illustrate the approach with our benchmark choice of five life dimensions: expenditures per consumption unit, health, quality of housing, (un)employment and wage arrears.

Interaction effects between y_{it} and Z_{it} and between q_{it} and Z_{it} are introduced in the satisfaction equation to model intergroup differences in preferences (see (4)). Even with our restricted set of five life dimensions, a large number of interactions remain to be estimated. We therefore simplified the model by keeping only the significant interactions.²⁷ Particularly interesting are the results for “unemployment” and “education”. As mentioned before, for both variables the direct effect is not significant. However, unemployment has a strong and significantly negative effect for males and for the higher educated. Wage arrears are also more important to the latter group. These results suggest that education does not only have an effect on aspirations, but also on preferences. Further, we find that the young Russians give a relatively smaller weight to health, and a relatively larger weight to consumption. Health is less important for males and in rural areas, and more important for members of minority groups. Housing matters more in

²⁶As an example, one of the capabilities in Nussbaum (2000)’s list is “being able to think and reason in a way informed and cultivated by an adequate education”.

²⁷For the estimation of these interaction effects we do not introduce age as a continuous variable, but we opt to use a dummy variable “young”, taking the value 1 for individuals with an age below 40.

rural areas, and less for the highly educated.

For our purpose, it is essential to consider the possibility of changes in the scaling factors resulting from social interactions and/or from processes of adaptation. We modelled social reference effects by introducing into the satisfaction equation the average value of the relevant life dimensions for geographical reference groups.²⁸ We introduce the mean values for unemployment and for expenditures per consumption unit calculated at the level of the 162 primary sampling units that are distinguished in the RLMS-HSE.²⁹ With this geographical definition the social comparison effect dominates for expenditures: the effect is significantly negative. For unemployment, however, the (cognitive) informational effect seems to be stronger: the larger the regional unemployment, the lower life satisfaction, as individuals base their future employment prospects on the labour market situation in their region.³⁰

Adaptation processes have been modelled in previous work by introducing “past expenditures” (Burchardt 2005, Di Tella et al. 2007). This variable is insignificant with the RLMS-HSE-data (see also Graham et al. 2004, Ravallion and Lokshin 2002, Senik 2004, Zavisca and Hout 2005). We have also tested lagged variables for the other functionings and did not find any significant result. It is possible that the living standards of many individuals in Russia in the period 1995-2003 were so volatile and uncertain that it was hard to adapt – moreover, in such a situation of deep uncertainty, expectations may be sensitive to all kinds of informational signals.

The aim of this estimation exercise is to recover information about preferences from the satisfaction data. As an illustration, Figure 1 compares the estimated indifference map in the health-expenditures space for young and old Russians living in an urban or in a rural environment. The larger weight of health in the preferences of the old shows up clearly. The differences between individuals living in urban and rural areas may be related to differences in the accessibility of health care.

4.2 Equivalent incomes and satisfaction with life

Before we can compute the equivalent incomes, we have to compute the “optimal” values $q^*(y; R)$ for all non-income life dimensions. Preferences for *health* are monotonic for all groups, so we take perfect health as the reference. For the *housing* dimension, which

²⁸Our results are rather robust if we implement other definitions of reference groups (including clustering on age, gender, education, being member of a minority, living in the same household).

²⁹The geographical approach has also been explored by Luttmer (2004) and has been implemented on the RLMS-HSE-data by Frijters et al. (2006).

³⁰Although this result is different from what is found in most previous work on unemployment (see e.g. Clark 2003), Senik (2004) already reported similar results for Russia.

Figure 1: Indifference map in the health-expenditure space.

is not naturally bounded, we select the 90th percentile value as the reference value. As all socio-demographic groups prefer a situation without suffering from *wage arrears*, we select that situation as the reference value. In our sample there is some disagreement on unemployment. The reference group (lower educated individuals in a low status job) prefers a situation of unemployment, while male and higher educated Russians prefer the situation of “not being unemployed”. It is important to notice that this preference is conditional on a given income. It reflects a trade-off between on the one hand the positive value of leisure and on the other hand the positive value of job satisfaction and the social status that is associated with having a job. The different results found for the different socio-demographic groups then stand to reason. We select for each socio-demographic group their most preferred situation as the reference value. For the other dimensions of life (used in the sensitivity analysis), all socio-demographic groups agree on their best values, so we select these values, or the 90th percentile in case of an unbounded variable.

Using these values for q^* , the observations for the relevant life dimensions (y_i, q_i) and our estimates for the parameters β , ϑ , Γ and Λ from Table 7, we can compute the equivalent incomes for all individuals in our sample (see (6)). It is instructive to compare equivalent incomes with the three most popular alternatives. The first is simply expenditures per consumption unit. The second alternative is an objective measure of well-being. We compute an objective measure that includes 4 dimensions: expenditures, health, housing, and unemployment. As in the Human Development Index (HDI), each dimension is normalized by first subtracting the minimal value and then by dividing by

its range. We use a simple arithmetic mean with equal weights to aggregate across the dimensions. As discussed above, this objective measure satisfies the dominance principle, but does not respect preferences (see Table 1). Third, we make direct use of the SWB scores as measure of well-being, a measure that satisfies the personal preference principle, but none of the other principles.

Tables 2, 3, and 4 show for the year 2000 the cross-tabulations of y_{it}^* with expenditures per consumption unit y_{it} , with the objective measure, and with subjective satisfaction S_{it} .³¹ Equivalent incomes are far from perfectly correlated with expenditures per consumption unit (the Spearman rank correlation coefficient ρ is 0.48). The highest correlation is between equivalent incomes and the objective measure ($\rho = 0.64$). Yet, more than 10% of the individuals in the top quintile according to the objective measure belong to the bottom quintile according to y_{it}^* . The correlation with subjective satisfaction is much lower ($\rho = 0.25$).

Table 2: Cross-tabulation of equivalent incomes Y_{it}^* and expenditures per consumption unit.

equivalized expenditures	quintiles of Y_{it}^*				
	1	2	3	4	5
1	0.32	0.40	0.19	0.08	0.01
2	0.20	0.26	0.27	0.20	0.08
3	0.17	0.18	0.26	0.24	0.15
4	0.15	0.11	0.19	0.29	0.26
5	0.16	0.05	0.08	0.20	0.52

Table 3: Cross-tabulation of equivalent incomes Y_{it}^* and an objective well-being measure

objective measure	quintiles of Y_{it}^*				
	1	2	3	4	5
1	0.44	0.37	0.13	0.05	0.02
2	0.17	0.43	0.30	0.11	0.01
3	0.13	0.14	0.36	0.32	0.06
4	0.15	0.02	0.18	0.39	0.25
5	0.11	0.04	0.03	0.13	0.66

A better insight into the differences between the three approaches can be obtained from Table 5. This table gives also an idea about the sensitivity of our results with respect to the choice of the elements in the functioning vector ℓ_i . Our sample for 2000 contains 1583 individuals with the lowest value (one) on the life satisfaction scale.³² The third last column of Table 5 draws a portrait of these individuals. The first column draws a similar

³¹The results for other years are similar.

³²Again, the results for other years are similar.

Table 4: Cross-tabulation of equivalent incomes Y_{it}^* and subjective satisfaction

subjective satisfaction	quintiles of Y_{it}^*				
	1	2	3	4	5
1	0.24	0.33	0.23	0.14	0.06
2	0.18	0.25	0.26	0.19	0.12
3	0.19	0.16	0.21	0.24	0.20
4	0.16	0.13	0.16	0.24	0.30
5	0.22	0.13	0.15	0.19	0.31

portrait for the 1583 individuals with the lowest expenditures per consumption unit. The other columns show analogous information for different definitions of the equivalent income, i.e. different vectors of life dimensions. Expenditures per consumption unit coincide with equivalent incomes if they are seen as the only functioning - we call this set I. When we add health as a second functioning, we get the picture in set II. The life dimensions vector is then gradually extended while moving from the left to the right of the table. When all variables, including the disturbance term, are considered as life dimensions, we arrive at the column with the satisfaction measures (set XII).

The second row in the Table (“newcomers”) shows for each column the percentage of individuals that are included among the deprived, and that were not included according to the definition in the column to the left of it. The composition of the deprived changes by more than half in going from set I (expenditures per consumption unit) to set II (equivalent incomes with health as an additional functioning). It then remains fairly stable until we go from set X to set XI, i.e. include age and the fixed effects. Adding the disturbance terms (set XII) again leads to important changes.³³ This pattern strongly suggests that our approach is not very sensitive to the choice of life dimensions but is very different from both the expenditures approach and the happiness approach.

The last two columns draw the portrait of the 1583 individuals with the lowest value according to two objective measures. We first consider the objective measure with four dimensions (expenditures, health, housing, and unemployment) introduced above. For comparison with the benchmark case, we also include an objective measure that takes additionally wage arrears into account (again we attribute equal weights to each of the dimensions). When moving from the penultimate column to the ultimate one, more than half of the worst off are “newcomers”, illustrating the sensitivity of the objective results to the (arbitrary) choices involved in the design of an objective well-being measure.

It is instructive to focus on our key concepts: expenditures per consumption unit

³³One could wonder whether set XI is the real “outlier”, in that set XII would bring us back closely to set X. This is not the case, however. When we compare set XII directly to set X, there are 71% “newcomers” in the former.

Table 5: Portrait of the deprived in different approaches in 2000.

	Set I	Set II	Set III	Set IV	Set V	Set VI	Set VII	Set VIII	Set IX	Set X	Set XI	Set XII	Obj (4 dim)	Obj (5 dim)
newcomers		59%	18%	6%	2%	3%	5%	9%	3%	3%	71%	72%		56%
income	1694	2730	2868	2875	2873	2919	2928	2929	3005	3092	2948	2667	2558	2983
expenditures	1188	3220	3245	3344	3354	3466	3480	3501	3568	3769	3046	3468	2825	3489
health	298	2.55	2.66	2.72	2.73	2.75	2.75	2.76	2.80	2.85	2.77	2.87	2.46	3.1
house	1406	1628	1463	1463	1464	1472	1479	1508	1512	1531	1645	1531	1425	1493
unempl.	12%	7%	8%	12%	12%	12%	11%	11%	11%	11%	17%	13%	37%	34%
arrear	14%	10%	11%	10%	12%	11%	11%	10%	10%	10%	20%	17%	6%	62%
high status	1%	2%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	0%	3%
middle status	36%	29%	28%	27%	28%	25%	25%	25%	26%	28%	35%	37%	11%	46%
higher educ.	59%	57%	49%	48%	49%	50%	45%	46%	47%	48%	72%	66%	56%	78%
married	45%	52%	51%	50%	50%	50%	50%	42%	42%	43%	59%	52%	49%	62%
as married	11%	6%	6%	7%	7%	7%	6%	6%	6%	5%	6%	8%	8%	10%
divorced	8%	7%	6%	7%	7%	7%	7%	7%	7%	7%	9%	8%	8%	7%
widowed	18%	25%	25%	25%	24%	25%	26%	33%	32%	32%	18%	17%	21%	6%
mean unempl.	9%	9%	11%	11%	11%	11%	11%	11%	12%	12%	10%	10%	11%	10%
mean expend.	8153	8305	8249	8256	8257	8269	8270	8277	8282	8305	8277	8273	8222	8228
age in 2000	47	55	54	53	53	53	54	54	54	53	49	47	51	40
male	41%	28%	31%	31%	31%	32%	32%	30%	32%	32%	41%	42%	42%	53%
minority	12%	53%	57%	58%	58%	59%	59%	59%	60%	63%	14%	12%	16%	15%
rural	34%	23%	38%	39%	39%	39%	39%	37%	38%	37%	30%	35%	38%	40%
life satisfaction	2.03	2.19	2.21	2.22	2.22	2.22	2.22	2.24	2.24	2.27	2.15	1.00	1.97	2.13

Legend: The sets successively incorporate as functionalities: equivalized expenditures (Set I), self-assessed health (Set II), housing (Set III), unemployment (Set IV), wage arrears (Set V), occupational status (Set VI), education (Set VII), marital status (Set VIII), reference group unemployment (Set IX), reference group expenditures (Set X), age and personality traits (Set XI), the disturbance term (Set XII).

The composite indicators successively incorporate equivalized expenditures, self-assessed health, housing, unemployment (CI(4)) and wage arrears (CI(5)).

(set I), equivalent incomes in our favorite definition with five life dimensions (set V), life satisfaction (set XII) and the objective measure (the final column). These columns are shown in bold. The worst off according to the equivalent incomes and the objective measure are most similar, yet the number of people with wage arrears is much higher in the latter case. The differences between the results for life satisfaction and for equivalent incomes are particularly striking. The subjectively least satisfied individuals have larger expenditures, a better health and a nicer house than those with the lowest value of equivalent incomes. They are younger and better educated, are more likely to be male and less likely to belong to a minority group. Clearly, individuals that are least satisfied are not necessarily the most deprived on the main dimensions of life. The larger correlation between expenditures per consumption unit and equivalent incomes also shows up in the table. The main difference is with respect to health: health is valued strongly in equivalent incomes, certainly for a large fraction of (older and minority) people.

5 Conclusion

We have argued that intrapersonal comparisons of well-being based on individual satisfaction measures respect individual preferences when evaluating the situation of an individual at a given moment in time (under a consistency assumption). They are therefore more respectful of individual sovereignty than objective measures of well-being or hedonic measures that focus on feelings of happiness.³⁴ More specifically, if the SWB question is well crafted, it can legitimately be used to derive information about ordinal preferences at the individual level. However, subjective satisfaction measures may conflict with individual preferences in the context of interpersonal comparisons of well-being.

We introduced the concept of equivalent income that does satisfy the stronger version of individual sovereignty that is also applicable for interpersonal comparisons. Traditional life satisfaction equations can be used to recover the information about preferences that is needed for the calculation of equivalent incomes. We illustrated the method with RLMS-HSE-data for Russia. It turns out that the picture of well-being obtained with equivalent incomes is very different from the picture that is obtained by focusing either on material consumption or on subjective satisfaction.

Satisfaction surveys are only one possible source of data on ordinal preferences that may serve to the computation of equivalent incomes. Other sources include revealed preferences from observed choices and stated preferences. Each of these potential sources of information suffers from its own limitations. The limitations of estimations of preferences

³⁴Benjamin et al. (2012) show that life satisfaction measures are a better predictor of choices than measures of subjective feelings of happiness.

based on satisfaction surveys have been listed in Section 3. Let us briefly examine how they could be alleviated by a better design of the surveys.

To address the problem that individual fixed effects may capture relevant inequalities in fixed functioning, one could supplement satisfaction surveys with questions eliciting views about fixed personal characteristics. Time dummies raise a similar difficulty. Again, asking direct questions about the environment may be helpful in order to obtain information about global factors that affect the whole population at the same time.

To deal with variables like education that simultaneously affect life satisfaction and aspirations, one could seek to elicit information about aspirations, and to develop a structural model in which scaling factors are well identified separately from ordinary life dimensions.

To go beyond heterogeneity by socio-demographic subgroups, the information on life satisfaction could be supplemented with stated preferences at the individual level, although these may be limited anyway due to time and cognitive constraints. Similar constraints would make it hard to directly ask respondents to state their equivalent income (though in a context with few dimensions this has been tried by Fleurbaey et al. 2013).

Finally, we have already alluded to the benefits of minimizing confusion about affects and evaluation by putting respondents in better conditions for carefully thinking about the difficult issues the questionnaires confront them with, clearly separating the evaluative questions from the questions about feelings viewed as one aspect of life.

All this raises an even deeper issue. Can we assume that individual preferences over life dimensions exist and are reasonably stable? If not, the whole equivalent income approach collapses - but so does the large bulk of normative economics. While we believe that it makes sense to assume that individuals have some idea of what they consider to be important in life, it is probably realistic to assume that these preferences are not complete. This raises both normative and empirical issues. Further elaborating the theory to take this into account should be an important priority (Fleurbaey and Schokkaert, 2013).

References

- Adler M., E.A. Posner 2008, "Happiness research and cost-benefit analysis", *Journal of Legal Studies* 37: 253–292.
- Arrow K. 1951 (2nd ed., 1963), *Social Choice and Individual Values*, Yale University Press.
- Barrotta P. 2008, "Why economists should be unhappy with the economics of happiness", *Economics and Philosophy* 24: 145–165.
- Becker G., L. Rayo 2008, "Comment", *Brookings Papers on Economic Activity* 1: 88–95.

- Benjamin D., O. Heffetz, M. Kimball, A. Rees-Jones 2012, “What do you think would make you happier? What do you think you would choose?”, *American Economic Review* 102(5): 2083-2110.
- Bernheim B.D. 2009, “Behavioral welfare economics”, *Journal of the European Economic Association* 7: 267–319.
- Blanchflower D., A. Oswald 2004, “Well-being over time in Britain and the USA”, *Journal of Public Economics* 88: 1359-1386.
- Bok D. 2010, *The Politics of Happiness*, Princeton: Princeton University Press.
- Brun B., B. Tungodden 2004, “Non-welfaristic theories of justice: is the “intersection approach” a solution to the indexing impasse?”, *Social Choice and Welfare* 22: 49–60.
- Burchardt T. 2005, “One man’s rags are another man’s riches: Identifying adaptive preferences using panel data”, *Social Indicators Research* 74: 57–102.
- Burchardt T. 2006, “Happiness and social policy: barking up the right tree in the wrong neck of the woods”, *Social Policy Review* 18: 145–164.
- Chamberlain G. 1980, “Analysis of covariance with qualitative data”, *Review of Economic Studies* 47: 225–238.
- Clark A.E. 2003, “Unemployment as a social norm: psychological evidence from panel data”, *Journal of Labor Economics* 21: 323–351.
- Clark A.E., P. Frijters, M.A. Shields 2008, “Relative income, happiness, and utility: an explanation for the Easterlin paradox and other puzzles”, *Journal of Economic Literature* 46: 95–144.
- Clark A.E., A.J. Oswald 2002, “A simple statistical method for measuring how life events affect happiness”, *International Journal of Epidemiology* 31: 1139–1144.
- Deaton A. 2008, “Income, aging, health and wellbeing around the world: Evidence from the Gallup World Poll”, *Journal of Economic Perspectives* 32(2): 53–72.
- Deaton A., J. Fortson, R. Tortora 2010, “Life (evaluation), HIV/AIDS, and death in Africa,” in E. Diener, J.F. Helliwell, D. Kahneman (eds.) *International Differences in Well-Being*, Oxford: Oxford University Press.
- Debreu G. 1959, “Topological methods in cardinal utility theory”, in K. J. Arrow, S. Karlin, and P. Suppes (Eds.) *Mathematical methods in the social sciences*, Stanford: Stanford University Press, 16–26.
- Decancq K., M. Fleurbaey M., F. Maniquet F. 2014, “Multidimensional poverty measurement with individual preferences”, Princeton University, William S. Dietrich II Economic Theory Center Working Paper 058_2014.
- Decancq, K., M.A. Lugo. 2012, “Inequality of well-being: a multidimensional approach”, *Economica* 79: 721-746.

- Diener E. 1994, "Assessing subjective well-being: Progress and opportunities", *Social Indicators Research* 31: 103–157.
- Diener E., E.M. Suh, R.E. Lucas, H.L. Smith 1999, "Subjective well-being: Three decades of progress", *Psychological Bulletin* 125: 276–302.
- Di Tella R., J. Haisken-De New, R. MacCulloch 2007, "Happiness adaptation to income and to status in an individual panel", NBER Working Paper 13159.
- Di Tella R., R. MacCulloch 2006, "Some uses of happiness data in economics", *Journal of Economic Perspectives* 20: 25–46.
- Dolan P., D. Kahneman 2008, "Interpretations of utility and their implications for the valuation of health", *Economic Journal* 118: 215–234.
- Easterlin R. 1995, "Will raising the incomes of all increase the happiness of all?", *Journal of Economic Behaviour and Organization* 27: 35–48.
- Ferrer-i-Carbonell A., P. Frijters 2004, "How important is methodology for the estimates of the determinants of happiness?", *Economic Journal* 114: 641–659.
- Fleurbaey M. 2005, "Health, wealth and fairness", *Journal of Public Economic Theory* 7: 253–84.
- Fleurbaey M. 2009, "Beyond GDP: the quest for a measure of social welfare", *Journal of Economic Literature* 47: 1029–1075.
- Fleurbaey M., D. Blanchet 2013, *Beyond GDP. Measuring welfare and assessing sustainability*, Oxford: Oxford University Press.
- Fleurbaey M., S. Luchini, C. Muller, E. Schokkaert 2013, "Equivalent incomes and the economic evaluation of health care," *Health Economics* 22: 711–729.
- Fleurbaey M., F. Maniquet 2011, *A Theory of Fairness and Social Welfare*, Cambridge: Cambridge University Press.
- Fleurbaey M., E. Schokkaert 2013, "Behavioral fair social choice", *American Economic Journal: Microeconomics* 5: 180–205.
- Frederick S., G. Loewenstein 1999, "Hedonic Adaptation", in D. Kahneman, E. Diener, N. Schwarz (eds.), *Well-Being: The Foundations of Hedonic Psychology*, New York: Russell Sage Foundation.
- Frey B., S. Lüchinger, A. Stutzer 2004, "Valuing public goods: The life satisfaction approach", CESifo Working Paper 1158.
- Frey B., A. Stutzer 2002, "What can economists learn from happiness research?", *Journal of Economic Literature* 40: 402–435.
- Frey B., A. Stutzer 2007, "Should National Happiness be maximized?", Working Paper 306, Institute for Empirical Research in Economics, University of Zurich.
- Frijters P., J. Haisken-De New, M. Shields 2004, "Changes in the pattern and determinants of life satisfaction in Germany following reunification", *Journal of Human Resources* 39:

649–674.

Frijters P., I. Geishecker, J.P. Haisken-DeNew, M. Shields 2006, “Can the large swings in Russian life satisfaction be explained by ups and downs in real incomes?”, *Scandinavian Journal of Economics* 108(3): 433–458.

Graham C. 2009, *Happiness around the World: The Paradox of Happy Peasants and Miserable Millionaires*, Oxford: Oxford University Press.

Graham C., A. Eggers, S. Sukhtankar 2004, “Does happiness pay? An exploration based on panel data from Russia”, *Journal of Economic Behavior and Organization* 55: 319–342.

Groot W. 2000, “Adaptation and scale of reference bias in self-assessments of quality of life”, *Journal of Health Economics* 19: 403–420.

Gruber J., S. Mullainathan 2005, “Do cigarette taxes make smokers happier?”, *Advances in Economic Analysis and Policy* (Www.Bepress.Com) 5(1): Article 4.

Hausman D. 2010, “Hedonism and welfare economics”, *Economics and Philosophy* 26: 321–344.

Jones A., S. Schurer 2011, “How does heterogeneity shape the socioeconomic gradient in health satisfaction?”, *Journal of Applied Econometrics* 26: 549–579.

Kahneman D., A. Krueger, D.A. Schkade, N. Schwarz, A. Stone 2004, “Toward national well-being accounts”, *American Economic Review* 94: 429–434.

Kahneman D., A. Krueger, D.A. Schkade, N. Schwarz, A. Stone 2006, “Would you be happier if you were richer? A focusing illusion”, *Science* 312: 1908–1910.

Kahneman D., R. Sugden 2005, “Experienced utility as a standard of policy evaluation”, *Environmental & Resource Economics* 32: 161–181.

Kahneman D., R.H. Thaler 2006, “Anomalies. Utility maximization and experienced utility”, *Journal of Economic Perspectives* 20: 221–234.

Kahneman D., P. Wakker, R. Sarin 1997, “Back to Bentham? Explorations of experienced utility”, *Quarterly Journal of Economics* 112: 375–405.

Kaplow L., S. Shavell 2001, ‘Any Non-welfarist Method of Policy Assignment Violates the Pareto Principle’, *Journal of Political Economy* 109: 281–286.

Kimball, M., R. Willis 2006, “Utility and happiness”, Mimeo.

King M. 1983, “Welfare analysis of tax reforms using household data”, *Journal of Public Economics* 21: 183–214.

Kőszegi B., M. Rabin 2008, “Choices, situations, and happiness”, *Journal of Public Economics* 92: 1821–1832.

Layard R. 2005, *Happiness. Lessons from a New Science*, London: Allen Lane.

Layard R., G. Mayraz, S. Nickell 2008, “The marginal utility of income”, *Journal of Public Economics* 92: 1846–1857.

- Loewenstein G., P.A. Ubel 2008, "Hedonic adaptation and the role of decision and experience utility in public policy", *Journal of Public Economics* 92: 1795–1810.
- Luechinger S., P.A. Raschky 2008, "Valuing flood disasters using the life satisfaction approach," *Journal of Public Economics*, doi:10.1016/j.jpubeco.2008.10.003
- Luttmer E. 2004, "Neighbors as negatives: relative earnings and well-being", *Quarterly Journal of Economics* 120: 963–1002.
- Nussbaum M.C. 2000, *Women and human development: the capabilities approach*, Cambridge: Cambridge University Press.
- Nussbaum M.C. 2008, "Who is the happy warrior? Philosophy poses questions to psychology", *Journal of Legal Studies* 37: S81–S113.
- Oswald A.J. 1997, "Happiness and economic performance", *Economic Journal* 107: 1815–1831.
- Pazner E. 1979, "Equity, nonfeasible alternatives and social choice: A reconsideration of the concept of social welfare", in J.J. Laffont (Ed.), *Aggregation and Revelation of Preferences*, Amsterdam: North-Holland.
- Ravallion M., M. Lokshin 2001, "Identifying welfare effects from subjective questions", *Economica* 68: 335–357.
- Ravallion M., M. Lokshin 2002, "Self-rated economic welfare in Russia", *European Economic Review* 46: 1453–1473.
- Rawls J. 1982, "Social unity and primary goods" in A. Sen and B. Williams (eds) *Utilitarianism and beyond* Cambridge University Press.
- Rayo L., G.S. Becker 2007, "Evolutionary efficiency and happiness", *Journal of Political Economy* 115: 302–337.
- Robbins L. 1932, "An essay on the nature and significance of economic science", New York University Press.
- Russell J.A. 1980, "A circumplex model of affect", *Journal of Personality and Social Psychology* 39: 1161–1178.
- Sacks D.W., B. Stevenson, J. Wolfers 2010, "Subjective well-being, income, economic development and growth", NBER Working Paper 16441.
- Samuelson P.A. 1977, "Reaffirming the existence of 'reasonable' Bergson-Samuelson social welfare functions", *Economica* 44: 81–88.
- Samuelson P.A., S. Swamy 1974, "Invariant economic index numbers and canonical duality: Survey and synthesis", *American Economic Review* 64: 566–593.
- Schkade D.A., D. Kahneman 1998, "Does living in California make people happy? A focusing illusion in judgments of life satisfaction", *Psychological Science* 9: 340–346.
- Schokkaert E. 2007, "Capabilities and satisfaction with life", *Journal of Human Development* 8: 415–430.

- Sen A. 1985, *Commodities and Capabilities*, North-Holland, Amsterdam.
- Senik C. 2004, “When information dominates comparison. Learning from Russian subjective panel data”, *Journal of Public Economics* 88: 2099–2123.
- Sprumont Y. 2012, “Resource egalitarianism with a dash of efficiency”, *Journal of Economic Theory* 147: 1602–1613.
- Steffel M., D.M. Oppenheimer 2009, “Happy by what standard? The role of interpersonal and intrapersonal comparisons in ratings of happiness”, *Social Indicators Research* 92: 69–79.
- Stutzer, A.,B. Frey 2008, “Stress that doesn’t pay: the commuting paradox”, *Scandinavian Journal of Economics* 110(2): 339–366.
- Van Praag B.M.S., B.E. Baarsma 2005, “Using happiness surveys to value intangibles: the case of airport noise,” *Economic Journal* 115: 224–246.
- Van Praag B.M.S., A. Ferrer-i-Carbonell 2007, *Happiness Quantified. A Satisfaction Calculus Approach*, Oxford: Oxford University Press.
- Welsch H. 2009, “Implications of happiness research for environmental economics”, *Ecological Economics* 68: 2735–2742.
- Zaviska J., M. Hout 2005, “Does money buy happiness in unhappy Russia?”, Berkeley Program in Soviet and Post-Soviet Studies Working Paper.

A Appendix

Table 6: Descriptive statistics

	1995	1996	1998	2000	2001	2002	2003
<i>N</i>	4227	4879	5832	7096	7673	8262	7894
satisfaction	2.19	2.16	2.08	2.40	2.59	2.86	2.76
income (per consumption unit)	3780	3515	3037	3429	4168	4666	5187
expenditures (per consumption unit)	5278	4775	3807	4517	5009	5224	5828
self-assessed health	3.10	3.13	3.12	3.11	3.11	3.11	3.10
house (in 100.000 rubles)	1.54	1.55	1.65	1.68	1.74	1.76	1.77
unemployment (in %)	7	8	10	8	8	8	8
arrears (in %)	26	32	53	14	12	11	10
male (in %)	41	43	43	44	43	43	43
minority (in %)	15	15	14	14	14	14	14
rural (in %)	28	27	27	28	26	27	27
higher education (in %)	70	68	68	68	72	75	76
age (in 2000)	50	48	45	43	43	42	42
high status (in %)	2	1	2	3	4	4	3
middle status (in %)	51	54	51	51	50	49	49
married (in %)	72	66	58	55	53	53	53
as married (in %)	7	7	6	7	8	9	10
divorced (in %)	11	11	7	6	7	8	8
widowed (in %)	-	-	11	12	13	13	13

Table 7: Satisfaction estimation

	coefficients	standard errors
log expenditures (per cons. unit)	0.314***	(0.0264)
self-assessed health	0.432***	(0.0423)
housing (in 100.000 rubles)	0.284***	(0.0825)
unemployed	0.161	(0.135)
wage arrears	-0.0872	(0.0680)
high status	0.325***	(0.0970)
middle status	0.259***	(0.0461)
higher educ.	0.236	(0.153)
married	0.0907	(0.102)
as married	-0.0197	(0.103)
divorced	-0.292**	(0.110)
widowed	-0.489***	(0.121)
ref. group unemployment	-1.087**	(0.333)
ref. group expenditures	-0.176**	(0.0613)
age squared/100	0.0809***	(0.0171)
1996	-0.189***	(0.0525)
1998	-0.408***	(0.0752)
2000	-0.0809	(0.0962)
2001	0.158	(0.109)
2002	0.616***	(0.124)
2003	0.353*	(0.139)
young X health	-0.0960*	(0.0445)
young X expend.	0.0316+	(0.0188)
male X health	-0.120*	(0.0465)
male X unemployed	-0.347***	(0.101)
rural X health	-0.109*	(0.0542)
rural X house	0.217*	(0.107)
minority X health	0.118+	(0.0667)
minority X expend.	-0.253***	(0.0616)
high educ. X house	-0.193*	(0.0813)
high educ. X unemployed	-0.468***	(0.133)
high educ. X arrear	-0.150*	(0.0756)
N	40120	
pseudo R^2	0.082	

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$