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Beyond GDP

Measuring Social Progress in Europe

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ABSTRACT

In this paper we study the measurement of social progress. Recently, it has become widely accepted that focusing exclusively on income growth may lead to a too narrow-sighted measure of social progress. People care about other dimensions of life, such as their health, employment, social interactions and personal safety. Moreover, an exclusive focus on income growth remains blind to the distribution of income and well-being in the society. We propose therefore a set of six principles for a richer measure of social progress. In particular, we advocate the use of a measure based on “equivalent incomes”, which satisfies all our basic principles. We discuss and illustrate how an equivalent income approach can be implemented in Europe, using the ESS data for 2008 and 2010. We find that introducing inequality aversion and including other dimensions in the analysis of social progress leads to a remarkably different perspective on social progress in Europe.

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1. INTRODUCTION

The Europe 2020 “strategy for smart, sustainable and inclusive growth” is inherently multidimensional: it extends beyond GDP to formulate targets for employment, for research and innovation, for climatic change and energy, for education and for combating poverty. Yet, how can we measure the success of such a strategy? This question is related to a more fundamental one: how do we measure social progress?

The development of measures of social progress and well-being that go “beyond GDP” has been booming in recent decades, both in the academic world and in policy circles. In the academic world, the so-called Sen-Nussbaum approach to human capabilities has received considerable attention (there is now even a flourishing Human Development and Capability Association), but in recent years the dominance of this capability approach has been challenged by the rapidly growing literature on happiness and subjective satisfaction with life.³ In policy circles, the best known example of a measure that extends “beyond GDP” is the Human Development Index (HDI), proposed by the United Nations Development Programme (UNDP), which measures the performance of different countries in terms of their income, health and education, and is heavily inspired by the capability approach. The OECD launched its “Better Life Initiative” in 2011 (OECD, 2011). The European Commission expressed the urgent need to collect more and better information for measuring progress, well-being and sustainable development in its Communication on “GDP and beyond” (European Commission, 2009) and is now pushing for the collection of information to construct a multidimensional measure of the quality of life in its different member states (European Statistical System, 2011). All these initiatives have been spurred further by the publication of the so-called Stiglitz-Sen-Fitoussi report in 2009, which took stock of the existing approaches to measuring well-being and social progress and strengthened the link between academic insights and the various policy initiatives.

Yet, beneath the apparent consensus about the need to go “beyond GDP”, there are different approaches with sizeable differences in focus and in objectives, and the Stiglitz-Sen-Fitoussi report (2009) echoes these conflicts and contradictions. In this paper we will concentrate on the measurement of the well-being of the present generations, but this constitutes only one of the primary streams in the “beyond GDP” movement. An alternative (or complementary) approach focuses on sustainability, i.e. on the question whether it is possible to guarantee to *future* generations the same living standard as that enjoyed by the current generations. A set of indicators have been proposed to measure sustainability, often aiming at the construction of a corrected “green” GDP. There can be no doubt that safeguarding sustainability is an essential objective, but in our view sustainability is better measured by separate indicators (for instance, by measuring the level of capital that is transmitted to future generations) than by ambiguous attempts to correct present GDP. It is therefore an altogether different topic.⁴

³ An extensive theoretical discussion of the various approaches to going beyond GDP is provided by Fleurbaey and Blanchet (2013). Seminal references on the capability approach are Sen (1985, 1992) and Nussbaum (2000). See Schokkaert (2009) for a critical discussion. The happiness approach has been popularized by Layard (2005).

⁴ In this short paper, we cannot go into the different arguments for this position. A good discussion of the issues can be found in Fleurbaey and Blanchet (2013). The conclusion that sustainability should be measured

There is also some overlap between the “beyond GDP”-movement and the development of lists of specific policy indicators in a context with multiple policy objectives in different domains. An example is the list of social indicators, proposed in Atkinson et al. (2002). As another example, the Europe 2020 strategy has put forward a set of specific targets (such as reducing school drop-out rates below 10% or having 75% of the 20-64 years old employed by 2020). Adequate policy surveillance requires the formulation of specific policy targets, but these operational targets often refer to variables that are “inputs” in the process of creating well-being, rather than directly important “outputs”, i.e. life dimensions that contribute to well-being. Devoting 3% of the EU’s GDP to research and innovation (one of the Europe 2020 targets) is likely to contribute to the future well-being of European citizens, but is not one of the life dimensions about which citizens directly care. Even within the stream of measuring well-being, there exists a bewildering variety of approaches. Opinions differ about what are relevant dimensions of life and whether (and how) they should be aggregated. Some claim that aggregation over the various dimensions leads to an unacceptable loss of information (Nussbaum, 2000); others argue that it is unavoidable and can therefore be better done explicitly rather than implicitly (Fleurbaey and Blanchet, 2013). Some (e.g. Layard, 2005) claim that subjective satisfaction and happiness should be the one and only criterion to measure social progress (making the discussion on aggregation superfluous), while others argue that happiness is too subjective and personal even to be taken up in the list of life dimensions (Nussbaum, 2008). In addition, there are the well-known disagreements on how to handle distribution and inequality when we want to measure well-being for society as a whole.

In this paper we will address these questions in an explicit way. In section 2, we summarize our position by means of a set of principles. Each of these principles can (and should) be debated, but conceptual clarity helps to make the debate more transparent. In section 3 we then describe one specific proposal to measure well-being that satisfies our underlying principles: the so-called “equivalent income”. Again, many questions remain open, but the route that can (or should) be followed to answer them is clearly mapped out. The ultimate goal of our exercise is to come to the actual measurement of well-being and social progress in Europe. We will point out what data are needed to implement the concept of equivalent income – in fact it is sufficient to include a set of specific questions in an organized and regular fashion in individual surveys such as SILC. However, because the data that are available in the present version of SILC are insufficient, we will illustrate the main features of our approach with data from the European Social Survey (ESS, not to be confused with the use of the same acronym for the European Statistical System). We present the data and our calculation method in section 4 and the results in section 5. It will turn out that introducing other dimensions of life in addition to standard income measures changes the ranking of countries in terms of well-being and hence changes our perspective on social progress. Section 6 concludes.

The main purpose of this paper is to convey an intuitive general idea of the equivalent income approach. We do not go into the technical details. More formal and rigorous treatments can be found, *inter alia*, in Fleurbaey and Blanchet (2013), Fleurbaey and Maniquet (2011), Fleurbaey *et al.* (2009) and Schokkaert *et al.* (2011). There is one other empirical study (Fleurbaey and Gaulier, 2009) that has calculated equivalent incomes for different countries. The countries and the period

separately is also in the Stiglitz-Sen-Fitoussi (2009) report – and is underlying developments in practice at the EU and the OECD level.

considered are different, however, as is the technique to measure equivalent incomes. A direct comparison between their results and ours is therefore difficult. Yet, the broad picture of the country comparisons is reasonably similar.

2. TOWARDS AN AGGREGATE MEASURE OF SOCIAL PROGRESS: SOME PRINCIPLES

Historically, concepts such as “happiness”, “well-being” and “social progress” have been interpreted in many different ways, ranging from an almost metaphysical concept (deeply rooted in religion) to a psychological description in terms of feelings and emotions (McMahon, 2005). Present day discussions are obscured by the lasting presence of many of these interpretations. It should therefore be emphasized from the outset that in the context of policy evaluation, well-being and social progress are essentially political and ethical concepts. They refer to the objectives that a society should strive after. Formulating an adequate measure of social progress involves the implicit or explicit acceptance of a set of normative principles. It is a normative (not a self-evident psychological) position that “feelings of happiness” should be the ultimate goal of social policy. And to be clear from the start, it is a normative position that we will *not* endorse in this paper. In this section we state the principles that we *do* defend. This will result in the description of what we would consider an “ideal” approach to the measurement of social progress. Section 3 then proposes a specific way of operationalizing this ideal approach. In sections 2 and 3 we remain mostly at a theoretical level, but at the end of section 3 we will draw (pragmatic) conclusions concerning the statistical implementation of our theoretical ideas.

A. FOCUSING ON INDIVIDUAL WELL-BEING

One crucial normative starting point has already been implicitly present in the previous pages. To us, social progress means an increase in the well-being of the individual members of society. This “individual oriented” view is widely shared among European citizens and policy makers and seems to be the only reasonable position in a democratic society. In the past, the main challenge to this approach came from nationalistic movements formulating objectives directly at the level of the nation, but nowadays even nationalistic ideologies start from the interests of individual citizens – the discussion centres around the definition of citizenship.⁵ We formulate this as a first principle:

Principle 1 (Focus on individual well-being). *The ultimate goal of policy (and the ultimate criterion to evaluate social progress) is the well-being of the individuals making up a society.*

Note that endorsing this principle leaves open our core questions: how to measure well-being and how to take account of its distribution in society. We will return to these questions later in this section. It is also important to reemphasize here that our focus on the present generations does not mean that the fate of future generations is to be neglected. The sustainability of current living standards into the future is a crucial element in any evaluation of policies. However, in line with the recommendations of the Stiglitz-Sen-Fitoussi (2009) commission, we think that assessing

⁵ Even communitarians will argue in the last analysis that community ties are essential, mainly because they define what constitutes an individual. While they claim to have a broader view of the individual, the latter remains the central reference point. A recent challenge to our focus on individual human well-being is perhaps the animal rights movement. This issue is not taken up in this paper.

sustainability should be separated from the assessment of present well-being. The requirement of sustainability is a *restriction* to be imposed on the present generations in their pursuit of their own well-being and it should be assessed independently, based on a carefully chosen dashboard of physical indicators.

It should be clear that the well-being of individuals is not fully determined by their income position or material consumption. Individuals also care about their health, about the quality of their job and their personal relations, about their social interactions and personal safety, and about the natural environment in which they live.⁶ The starting point of any encompassing measure of social progress must therefore be the collection of information on these different dimensions of life. Our first principle implies a clear guideline to the choice of which dimensions to include: they should cover aspects of life that are directly relevant to the individual citizens. As noted above, measuring well-being is very different from creating a dashboard for evaluating policies. Policy targets can often be seen as “inputs”, which indirectly contribute to well-being as “outcome” and may therefore be very relevant. Yet, they should not directly enter into a measure of well-being or social progress as their impact on individual well-being may be very different, depending on the characteristics of the individual (providing better public transportation, for instance, may have a very different impact on the effective mobility of different individuals).

Principle 2 (Focus on outcomes). *Information must be collected on the different dimensions of life that are important for the well-being of individual citizens. This information should be about direct outcomes, and not about inputs.*

It is important to emphasize here that our focus on individual well-being does not exclude the belief that the collective characteristics of a country play an important role. We already mentioned the importance of the natural and the social environment, as captured, for example, by the quality of social interactions and by feelings of safety and security. Yet, these collective features should play through their effects on individual well-being. This has the definite advantage that it also allows the integration of distributional considerations in these collective dimensions: a healthy and attractive natural environment and a safe neighbourhood are typically local public goods in the economic jargon, and the spacing of the population over the territory is not random. A striking example from the US is discussed by Currie (2011) who shows that pregnant mothers living near a toxic release inventory give birth to less healthy babies – and that low-educated black mothers are heavily overrepresented in the population living in these neighbourhoods.

While the general principle guiding the choice of dimensions seems well-defined, there is still a long way to go before we arrive at a specific list of concrete dimensions. One can formulate these dimensions at an aggregated (e.g. overall health) or a very specific level (e.g. presence of specific diseases). The former approach may result in a great deal of overlap, the latter approach in a long and intractable list of variables. At a more fundamental level, there are different views on how to justify the choice of relevant dimensions. The best known list is that of Nussbaum (2000). It is grounded in an “objective”, Aristotelian view of what is essential for human flourishing. At the other extreme, one can situate attempts to base the list on direct questioning of the individuals concerned (see, for example, Clark, 2005). Somewhere in between we find Sen’s (2004) proposal that we decide

⁶ As documented by a large scale survey organised by the World Bank, even the poorest among the globally poor see poverty and well-being as multidimensional notions (Narayan *et al.*, 2000).

about the relevant list through public reasoning in a democratic process. Alkire (2002) gives an interesting overview of different lists that have been proposed in the literature. This overview leads to a somewhat surprising conclusion: despite the large variety of approaches and the differences in opinion about the underlying logic, the specific proposals are strikingly similar.

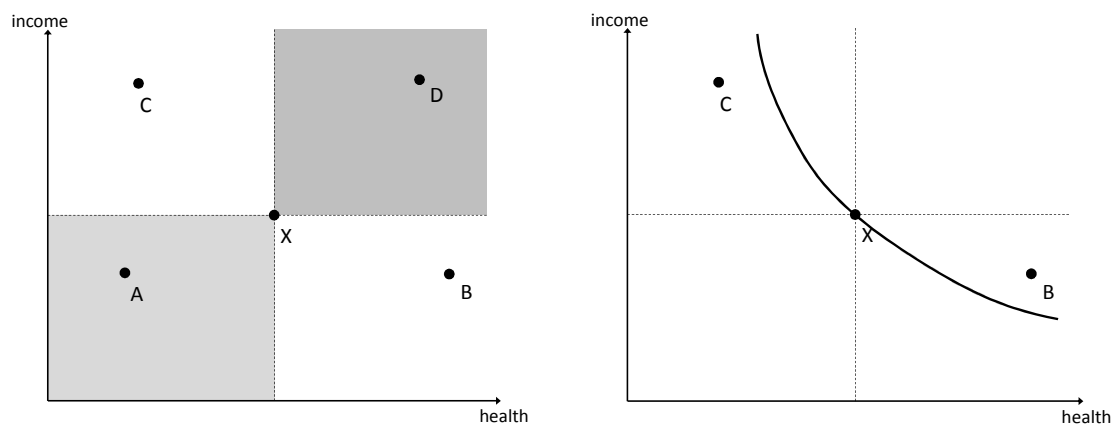
Table 1. Lists of dimensions

European Statistical System (2011)	OECD (2011)	Canoy et al. (2010)
Material living conditions	Income and wealth Housing conditions	Standard of living
Education	Education and skills	Education
Natural and living environment	Environmental quality	Environment
Productive and valued activities	Job and earnings	Productive and valued activities
Health	Health status	Health
Leisure and social interactions	Work-life balance Social connections	Quality of social interactions Culture and entertainment
Experience of life	Subjective well-being	
Governance and basic rights	Civic engagement and governance	Basic rights
Economic and physical security	Personal security	Safety

The same is true for the lists that have been proposed for practical applications. There appears to be some consensus that it makes sense to work with a first layer of broader encompassing dimensions that may, if necessary, be made operational through a second layer containing more specific indicators. Table 1 summarizes and compares three proposals of such top-layer lists. The first was put forward by the European Statistical System (2011), the second proposed by the OECD (2011), the third (Canoy *et al.*, 2010) is based on an attempt to operationalize (and adapt) Nussbaum's ideas. The similarities are very striking. If one accepts (as we do) that the ultimate aim is to arrive at a single synthetic indicator of well-being, the similarities are even more reassuring, since (partial) overlap will be taken care of through the choice of the weights used to get at the synthetic indicator. Let us now discuss the arguments in favour of constructing such a synthetic measure.

B. WHY CONSTRUCT A SYNTHETIC INDICATOR?

Suppose that we have reached consensus about a possible list of life dimensions. Many observers prefer to remain at that level and exhibit strong resistance to "indicator aggregation". As an example, in the present proposals for the European Statistical System it is stated explicitly that "aggregation should be limited to transparent methods with a sound scientific basis agreed upon by the statistical community. (...) Composite indicators combining individual indicators that have no common meaningful unit of measurement and implying arbitrary choices for weighting the sub-indicators cannot be labelled as official statistics and should thus remain in the research or political sphere" (European Statistical System, 2011, p. 13).

Figure 1. The need for a synthetic indicator

This position is understandable from the perspective of a guardian of official statistics. There is indeed no consensus about the best aggregation procedure. However, it would be very deplorable if agnosticism at the statistical level were translated into a similar agnosticism at the political level. For policy evaluation, it is necessary to construct synthetic indicators. We will argue that one can only say that one policy is better than another policy if the overall consequences of the first are better than those of the second.⁷

Let us illustrate the need to use synthetic indicators with the example in Figure 1, which depicts situations in a world with only two life dimensions, say income and health. Suppose we have to evaluate a policy that brings a society into state X versus a policy that brings a society into one of the states A or D. It is clear from the left-hand panel of Figure 1 that the society scores better in state D than in state X on both dimensions (income and health), so that it is natural to say that situations in state D (and all other situations in the dark shaded area) are better than situation X. This is an application of the so-called “dominance criterion”, which states that whenever a situation is better in all relevant dimensions of life, it is a preferred situation. Following that same criterion, the situation in state X can be seen as better than A (and all other situations in the light shaded area). But what about situations B and C? One can easily verify that none of these two situations can be ranked with respect to X using the dominance criterion. In practice, the typical decision problem will often be one in which there is indeed no dominance and, moreover, the likeliness of dominance occurring reduces quickly if the number of relevant dimensions increases. If we want to compare situations X, B and C, we need a synthetic indicator. One way of representing the use of such an indicator is given in the right-hand panel of Figure 1 where the curve through X connects all (income, health) combinations, which are deemed equally good as X, or in economic jargon, which are said to yield the same social welfare as X. This means that the policy maker will be indifferent between all the combinations connected by the curve. Using this so-called “social indifference” curve through X, we can now see that X is better than C (C is below the curved line, hence gives “less” social welfare) but

⁷ We explicitly take a consequentialist position on policy evaluation here. Justifying this position goes beyond the objectives of this paper, but we do indeed believe that consequentialism is the only useful approach to policy evaluation – and, in any case, the only approach that allows for the integration of scientific insights into the policy debate. The crucial and interesting question is what consequences should be taken into account and how?

worse than B (which is above the curved line). Using the social indifference curve, all policies can then be ranked in a coherent way that is consistent with the dominance criterion.

If one has a synthetic indicator at one's disposal, one has all the information needed to construct the social indifference curve used in the right-hand part of Figure 1. Obviously, the construction of a synthetic indicator requires that it is meaningful to reason in terms of trade-offs, i.e. that the different dimensions of life are commensurable. This commensurability assumption is debated in the academic literature and, as noted above, it is also not very popular in policy circles. We will argue that if all situations have to be evaluated in a coherent way, one cannot avoid constructing a synthetic indicator.

Let us start with a pragmatic point. The main motivation to go “beyond GDP” is to broaden the scope of effects that are considered when measuring social progress or evaluating policies. When one sticks to the simple enumeration of a list of dimensions, it is likely that for all concrete cases one (or a few) dimensions will determine the decision and, more specifically, that the dimensions that are easy to quantify will receive a larger weight than the “softer” dimensions that are harder to quantify. Since traditional economic growth remains an obvious and natural candidate for consideration, the collection of information on more dimensions threatens to have only a limited impact on decision-making and on the public debate. It is striking that the publication of simple one-dimensional synthetic indicators on all kinds of issues (such as the competitiveness of an economy, respect for civil rights in a country or the HDI) gets a large amount of attention and media coverage, compared to more sophisticated multidimensional approaches. In sum, going beyond GDP will only become feasible if there is an attractive alternative, which is equally easy to understand and communicate.

There is a more substantial problem with rejecting the synthetic approach: explicit and open aggregation risks being replaced by implicit and hidden trade-offs. Returning to the example in Figure 1, politicians will have to choose between X, B and C, even when the analysts refuse to construct synthetic indicators. If politicians opt for policy B, they implicitly accept that its consequences are better than those of C and X. This gives us indirect information about the shape of the implicit social indifference curve (i.e. the curved line in the figure) used by the politicians. But if this information is not made explicit, there is a real danger that decisions will be incoherent over time, thus leading to a waste of available public resources. In fact, separate decisions may be strongly influenced by volatile public opinion and by one-issue lobby groups, whose relative influence will change over time. One may then (implicitly) give up much income in favour of a slight health improvement on one occasion, while on another occasion decisions may lead to a relatively small increase in income but with very bad health consequences. Of course, we do not think that the construction of a synthetic indicator will have a miraculous effect in terms of increased policy coherence. However, it may at least explicitly expose the most striking inconsistencies, and therefore contribute to a more rational process of decision-making.

Moreover, constructing a synthetic indicator is the best way of taking account of cases of cumulative deprivation. Before going deeper into this topic in the next section, let us emphasize that opinions about what would be an adequate synthetic indicator may differ. Inherently, the choice of such an indicator involves value judgments. We will first defend our own principles and return to the challenge of diverging opinions later in this paper.

C. ACCOUNTING FOR CUMULATIVE DEPRIVATION

Assume that sufficient information on the different dimensions is available at the level of the individual citizens. This is not an unrealistic assumption, since this information can be collected in a straightforward way through a survey with a representative sample of the population (like SILC). This information can then be summarized in a large matrix like the one presented in the light shaded area of Table 2, where x_{ij} refers to the outcome of individual i in dimension j . There are n individuals and k dimensions.

Of course, this matrix as such is not tractable. The usual procedure to summarize the information in Table 2 is to calculate the “average” values for each dimension: this would result in a vector (X_1, X_2, \dots, X_k) with one value per dimension, as shown in the dark shaded row in Table 2. Yet, looking only at the averages means that one completely neglects all distributional issues. Most people believe that justice is an important component of social progress and that one therefore cannot remain blind for inequality. At first sight, the natural way to do so is to complement information about aggregate values with information about the distribution on the different dimensions. This idea is also incorporated in the proposal made by the European Statistical System (2011) that proposes measures such as “the share of people with an equivalized disposable income below the risk of poverty threshold”. In Table 2, we summarize such information in the bottom row with the distributional indicators $I(\cdot)$ for each dimension.

Table 2. Structuring the information

	dimension 1	dimension 2	...	dimension k	well-being
individual 1	x_{11}	x_{12}	...	x_{1k}	$W_1(x_{11}, x_{12}, \dots, x_{1k})$
individual 2	x_{21}	x_{22}	...	x_{2k}	$W_2(x_{21}, x_{22}, \dots, x_{2k})$
...	
individual n	x_{n1}	x_{n2}	...	x_{nk}	$W_n(x_{n1}, x_{n2}, \dots, x_{nk})$
AGGREGATE	X_1	X_2	...	X_k	$SW(W_1, W_2, \dots, W_n)$
DISTRIBUTIONAL INDICATOR	$I(x_{11}, \dots, x_{n1})$	$I(x_{12}, \dots, x_{n2})$...	$I(x_{1k}, \dots, x_{nk})$	$I(W_1, W_2, \dots, W_n)$

While this dimension-by-dimension approach is common, it may be misleading. Consider the simple example in Table 3, in which we compare two hypothetical situations A and B. In each of these situations, the society consists of two individuals. We suppose that there are only two dimensions to be considered, income and health, and that their values can be measured. In the bottom panel, the poor individual is in the worst health situation and the rich individual in the best health situation, whereas income and health are more mixed in the society described in the top panel. In this simple numerical example, the procedure described above results in an average value of 55 for both dimensions. As for the distributional indicator, we present the ratio between the “highest” and the “lowest” value in society: in our example, this is 10/1 for both dimensions in both situations. The information that would be collected according to a dimension-by-dimension approach is given in italics in the two bottom rows of Table 3. It is completely identical for situations A and B, which

would therefore be evaluated as equally good. Arguably, this goes against the ethical intuitions of many.⁸

Let us look now at the last column. Suppose that we measure individual well-being as the simple average for all individuals over all the dimensions (which is an overly simplistic assumption, made here only for convenience and to which we will return in the following section). Average well-being is the same in situations A and B, but this is definitely not true for inequality in well-being. Both individuals are equally well off in situation A, but the range is 10/1 in situation B. The root cause of the problem is immediately clear from Table 3: in situation B “income” and “health” are highly correlated – individual 2 suffers from cumulative deprivation. This is not true in situation A. Looking at the information dimension-by-dimension hides this essential feature of the situation.⁹

Table 3. Aggregation and distribution: a hypothetical example

SITUATION A			
	income	health	well-being
individual 1	100	10	55
individual 2	10	100	55
Average	55	55	55
distribution	10/1	10/1	1/1

SITUATION B			
	income	health	well-being
individual 1	100	100	100
individual 2	10	10	10
average	55	55	55
distribution	10/1	10/1	10/1

It is clear, therefore, that if one takes inequality seriously, one has to summarize the information in Table 2 row-by-row instead of column-by-column. As illustrated in the last column, one then constructs first a measure of well-being (say $W_i(x_{i1}, x_{i2}, \dots, x_{ik})$) at the individual level and then aggregates these individual measures of well-being to get an indicator of overall social welfare. In Table 2 we introduced an aggregate indicator $SW(W_1, \dots, W_n)$ and an inequality measure (W_1, W_2, \dots, W_n) . Later in the paper, we will come back to the precise specification of these measures. Nevertheless, we can already formulate the basic insight of Tables 2-3 as follows¹⁰:

Principle 3 (Accounting for cumulative deprivation). *Accounting for cumulative deprivation requires that one first constructs an index of well-being at the individual level and then aggregates these well-being indices across individuals.*

⁸ We can quote Pogge (2002, p. 11): “Consider institutional schemes under which half the population are poor and half have no access to higher education. We may plausibly judge such an order to be more unjust when the two groups coincide than when they are disjoint (so that no one bears both hardships)”.

⁹ See Decancq (2009) on the impact of neglecting cumulative deprivations when measuring well-being in Russia.

¹⁰ This principle is perfectly in line with Recommendation 8 of the Stiglitz-Sen-Fitoussi report (2009): “Surveys should be designed to assess the links between various quality-of-life domains for each person, and this information should be used when designing policies in various fields”.

D. CONSTRUCTING A SYNTHETIC INDICATOR OF SOCIAL WELFARE

If one accepts our third Principle, it is obvious that there are two aggregation steps to arrive at an overall synthetic indicator of social welfare. In a first step, an index of individual well-being is constructed for each individual. In the second step these indices are then aggregated across all individuals of the society. For both steps one has to take an essentially normative position, but the logic underlying them is very different.

I. AGGREGATION 1. CONSTRUCTING AN INDEX OF INDIVIDUAL WELL-BEING

Let us first look at the first aggregation step. How do we weigh the different dimensions in the construction of an individual index of well-being?¹¹ We are immediately confronted with the obvious fact of life that different individuals have very different ideas about the relative importance of the different dimensions (have different “preferences” in the economic jargon).¹² Some are quite willing to run considerable health risks to earn a larger income; others spend a large part of their time exercising and try to have a healthy diet. Some prefer to live in a lively city with a rich supply of cultural events and many opportunities for social interactions; others prefer to live in a quiet natural environment. Is it then acceptable to impose one uniform view about what is a good life on all these citizens? We suggest that this is hard to defend if one accepts our Principle 1 (Focus on individual well-being) and that it is much more natural to impose the following principle.

Principle 4 (Respect for individual ideas about a good life). *The weighting scheme applied to construct the measure of individual well-being should respect the individual ideas about what is a good life.*

This principle implies that a satisfactory measure of well-being should take into account the large inter-individual variation in life projects and opinions on the good life. It immediately discards the use of so-called “objective” indices with weights that are *a priori* fixed by the analyst (or the policy maker). In fact, most existing “objective” synthetic indicators follow the “standard” approach of first aggregating the outcomes across individuals dimension-by-dimension and then aggregating over the dimensions. The best known example is the HDI of the UNDP that, at least until recently, summarized three dimensions (log income lny , life expectancy at birth le and educational participation ep ¹³) by computing

$$(1) \quad HDI_i = \frac{1}{3} \frac{lny_i - lny^L}{lny^H - lny^L} + \frac{1}{3} \frac{le_i - le^L}{le^H - le^L} + \frac{1}{3} \frac{ep_i - ep^L}{ep^H - ep^L}$$

¹¹ See Decancq and Lugo (2013) for a survey on the various statistical methods that are used to set weights in practice.

¹² There is much confusion about the interpretation of the term “preferences” and this adds to the misunderstandings between economists and other social scientists. We use the term because it is a convenient one. Yet we emphasize that it should be interpreted in a proper way: when we talk about preferences in this paper, we refer to the individual conception of a good life. This Rawlsian concept includes the values and normative convictions of the said individuals and should definitely not be reduced to their mere egoistic self-interest.

¹³ There were two indicators for educational participation (the adult literacy rate and the combined school enrolment ratio), but for simplification we summarize them in one indicator ep .

where the superscripts “H” and “L” indicate upper and lower boundaries respectively. As an example, for life expectancy these boundaries were set at 85 and 25 years respectively. The rescaling of the original variables aims at expressing the scores on the different dimensions in the same units, i.e. as the “distance” that the country has covered from the lowest possible value to the best possible value. At first sight, this rescaling makes it more natural to take in the second step a simple unweighted average over the different dimensions. Yet, even after rescaling the variables, this simple average with equal weights is hard to accept, as it implies perfect substitutability between the different dimensions. Closer analysis shows that the HDI, after accounting for the rescaling, imposes arbitrary trade-offs between the different dimensions. Such an arbitrary weighting scheme cannot track the differences in preferences of different individuals.¹⁴

This is a good place to return to the question of incommensurability of dimensions and the position of the European Statistical System against “indicator aggregation”. Indeed, we agree with the European Statistical System that there is no good theoretical framework to aggregate the different dimensions at the global level when one follows the common approach of collecting the information dimension-by-dimension. The arbitrary (and unattractive) assumptions underlying the HDI illustrate this point. Things change, however, when one first computes a measure of individual well-being (as advocated in our Principle 3), and even more so if one accepts our Principle 4. Throughout their lives, all individuals take decisions involving trade-offs between the different dimensions – and/or evaluate their lives in these terms. At the level of individual evaluation, the different dimensions of life are treated as commensurable. Rather than complicating things, the construction of an individual measure of well-being is therefore a necessary first step to arrive at a meaningful synthetic indicator.

Recently, “happiness” or “subjective satisfaction” measures have attracted much attention – typically based on survey questions of the type: “Everything considered, how satisfied are you with your life?” Similar questions have now been asked in dozens of surveys to thousands of respondents and the answers turn out to be robust.¹⁵ They show convincingly that life satisfaction does not only depend on material living conditions, but also on almost all dimensions enumerated in Table 1. If this is the case, and if we want to respect individual preferences (recall our Principle 4), one may be tempted to simply use these satisfaction measures as indicators of individual well-being. Moreover, life satisfaction can be measured in a rather straightforward way. Are we – as observers – not complicating things unnecessarily by constructing a synthetic indicator of well-being ourselves, rather than leaving this to the responsibility of the respondents in a survey? Does social progress not ultimately consist in increasing “happiness”?

In fact, measuring social progress in terms of the “total happiness” in the society boils down to a simple revival of traditional Benthamite utilitarianism. This philosophical approach has been heavily

¹⁴ See, for example, Decancq *et al.* (2009) for a critical discussion of the HDI. Given that its linear functional form implies perfect substitutability, it is highly surprising to read in the Human Development Report of 2005 that with the HDI “losses in human welfare linked to life expectancy, for example, cannot be compensated for by gains in other areas such as income or education” (UNDP, 2005, p.22). This is clearly not correct. The definition of the HDI has been changed in 2010 for the publication of the 20th Human Development Report. It remains an “objective” index, however, and while it no longer imposes perfect substitutability, it still implies troubling trade-offs between the dimensions (see Ravallion, 2012).

¹⁵ In fact, things are less clear-cut than suggested by this statement. Researchers still disagree about the relative importance of cognitive and affective components in the question and about the reliability of the questionnaire method (see, for example, Kahneman and Krueger, 2006).

criticized. The main counterarguments are neatly summarized in Sen (1985). This is not the place to go into this everlasting philosophical debate, but we want to stress that measuring individual well-being in terms of subjective satisfaction does *not* respect personal preferences. This at first sight surprising insight is related to what Sen (1985) has called the problem of “physical-condition neglect”: subjective satisfaction is grounded on the mental attitude of the person, and risks to neglect his or her real physical conditions. Subjective satisfaction is not only determined by objective characteristics of life and by opinions on what is a good life, but also by aspirations and expectations – and the latter adapt to the objective circumstances: “A person who is ill-fed, undernourished, unsheltered and ill can still be high up in the scale of happiness or desire-fulfilment if he or she has learned to have ‘realistic’ desires and to take pleasure in small mercies” (Sen, 1985, p. 21).

Physical-condition neglect and adaptation are not mere philosophical notes in the margin. The empirical literature on subjective satisfaction now offers plenty of examples showing that adaptation is a pervasive real-world phenomenon. The most striking examples are situated in the sphere of health. Countries with higher rates of HIV prevalence do not systematically report poorer life (or even health) satisfaction, yet individuals (and countries) care about HIV and prefer to have a lower rate (Deaton, 2008). Individuals who have lost a limb may, after adaptation, recover a good satisfaction score – but still express a strong aversion to disability (Loewenstein and Ubel, 2008). Adaptation also occurs in other dimensions of life. The pervasiveness of the adaptation phenomenon implies that one has to choose. If one accepts our Principle 4, subjective satisfaction cannot be accepted as an adequate measure of well-being. Since we believe that the poor and the ill are still poor and ill (and would prefer to be rich and healthy), even if they have learnt to embrace their lot, we keep to our Principle 4. But other people obviously may take a different position. This illustrates that choosing measures of individual well-being and of social progress is ultimately a normative problem.

Based on the argument of physical-condition neglect, we have now discarded the idea that subjective satisfaction can act as an encompassing measure of individual well-being. This does not imply that “happiness” is completely irrelevant. “It would be odd to claim that a person broken down by pain and misery is doing very well” (Sen, 1985, p. 17). Yet, feelings of subjective happiness or satisfaction are only part of the story. They should at best be seen as one specific element in the vector of life dimensions. This is also the position taken by the European Statistical System and by the OECD (see Table 1). By virtue of principle 4, the relative importance given to the dimension “affective happiness” may differ from individual to individual. In the light of the present debate and the growing popularity of measures of subjective satisfaction, it is good to formulate our position as a fifth principle:

Principle 5 (Avoidance of physical-condition neglect). *Happiness (or subjective life satisfaction) may be one of the important dimensions of life, but it should not be seen as an encompassing measure of individual well-being.*

Until now we have formulated “respect for own ideas about a good life” and “avoidance of physical condition neglect” as basic principles for the construction of a synthetic index of well-being. The question remains open on how to implement these principles, now that we have discarded two popular approaches to measure well-being: objective measures with weights that are set *a priori* by the policy makers or the analysts and direct measures of subjective satisfaction. We will have to look

for some middle ground between these two extreme positions. We will come back to the issue of practical implementation in the next section. Perhaps surprisingly, it will turn out that the empirical results on subjective satisfaction may still be very useful for this exercise. Let us now first consider the second aggregation step, i.e. the aggregation of all individual well-being indices in the society.

II. AGGREGATION 2. CONSTRUCTING AN INDEX OF SOCIAL WELFARE

Assume we have found a measure W_i representing the well-being of individual i . We still face the question of how to aggregate these values of W_i for the different individuals to arrive at an overall measure of social welfare. This requires a normative choice on the importance that is given to inequality. This is a question of justice, which cannot be settled by starting from individual preferences: even if individuals did not care about others, the justice problem would not disappear. Note that there is no inconsistency in our treatment of individual preferences. Our position that individual preferences should be respected when constructing an individual measure of well-being did not follow from these individual preferences themselves, but was also based on a normative perspective and a specific view of justice.

Opinions differ about what justice requires in terms of redistribution. From a Rawlsian perspective, priority should be given to the worst-off individuals in society, whereas in the utilitarian tradition the objective function for society should be to maximize the total or average well-being, thereby neglecting its distribution.¹⁶ A natural way to introduce a concern for inequality is to start from average well-being M and to penalize it by a measure of the inequality of its distribution I_ρ . Hence, we can write social welfare SW as

$$(2) \quad SW = M(1 - I_\rho).$$

This expression decomposes social welfare in a “level” (M) and a “distributional” component ($1 - I_\rho$).

One attractive possibility is to select I_ρ from the so-called S-Gini family of inequality measures (Donaldson and Weymark, 1980), which defines inequality as a weighted average of the ratios of the well-being level W_i and M for each individual:

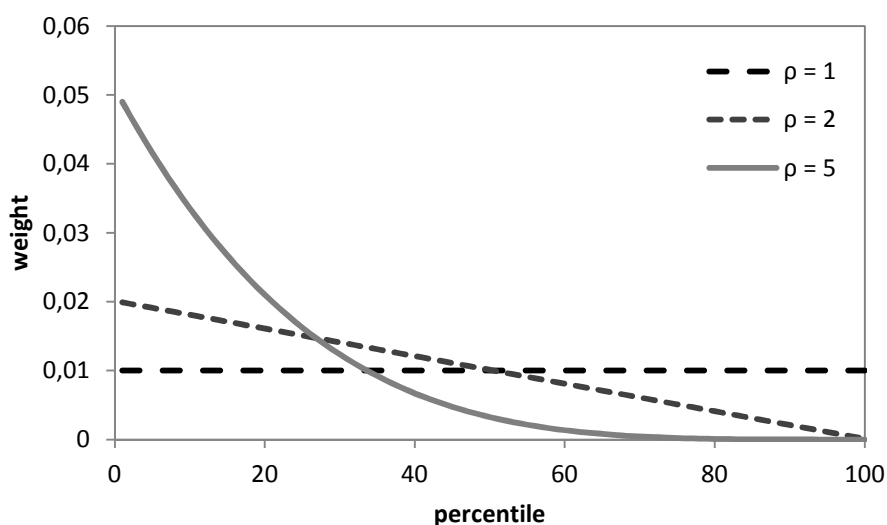
$$(3) \quad I_\rho = 1 - \sum_{i=1}^n \left[\left(\frac{n-i+1}{n} \right)^\rho - \left(\frac{n-i}{n} \right)^\rho \right] \frac{W_i}{M}$$

All individuals are ranked from worst-off to better-off, so that i reflects their position in the distribution. The weights for each individual are then given by the term between square brackets. These weights are larger for individuals with a lower position in the overall well-being distribution if $\rho > 1$. This parameter ρ , which can be interpreted as “the degree of bottom sensitivity” or “inequality aversion” of the inequality index, offers a convenient way to capture differences in opinion on what justice requires. The pattern of weights attached to different positions in the income distribution for different values of ρ is shown in Figure 2. If $\rho = 1$, all individuals get the same weight in (3), i.e. $1/n$,

¹⁶ Neglecting inequality in the distribution of well-being does not imply that one cannot advocate redistribution of income, as income may have a larger *marginal* effect on the well-being of the poor than on the well-being of the rich.

so that I_ρ equals 0 for any distribution and expression (2) reduces to the simple average, neglecting the distribution as in the utilitarian tradition. If ρ goes to infinity, we give weight exclusively to the bottom of the distribution and expression (3) reduces to $1 - W_1/M$ so that expression (2) collapses to W_1 , the well-being of the worst-off. This is the Rawlsian position. Intermediate values of ρ represent positions in between these two extremes. Figure 2 shows the weights for the cases $\rho = 5$ and $\rho = 2$. Note that in the former case, individuals with an income above the median (percentile 50 and above) get a very small weight. The case $\rho = 2$ (with linearly declining weights) is particularly interesting, because the inequality measure in expression (3) then becomes the well-known Gini coefficient.

Figure 2. Weights in the S-Gini social welfare function at each percentile



To capture different ideas about the relative importance of inequality versus the level of well-being and about the relative weight to be given to the poorest in measuring inequality, it makes sense to perform a sensitivity analysis and to compare social welfare for different values of the parameter ρ . Let us summarize this brief discussion as:

Principle 6 (Inequality aversion). *Justice requires accounting for inequality in individual well-being. This can be done in a natural and flexible way by introducing an inequality aversion parameter in the analysis.*

3. A SPECIFIC PROPOSAL: EQUIVALENT INCOME

In the previous section, we advocated a set of six basic principles that measures of social welfare and social progress should satisfy. The main conclusions are that social welfare is some function of individual well-being, that different social welfare functions can incorporate different degrees of inequality aversion, and that the measurement of individual well-being should respect the individual's ideas about what is a good life, i.e. respect their preferences. We rejected the use of happiness or subjective life satisfaction as a synthetic indicator. This leaves open the crucial question of how to construct an index of individual well-being that avoids the problem of physical-condition

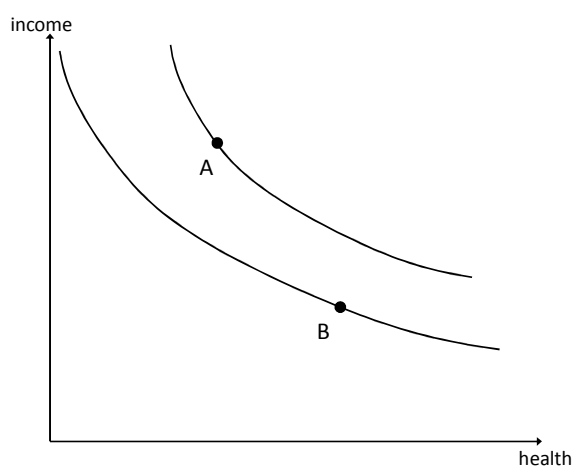
neglect and hence is not subjective satisfaction, but still respects preferences. In this section we will propose a possible answer to this question: the concept of “equivalent income”. We first introduce the basic idea and then discuss how it can be operationalized.

A. THE BASIC IDEA

To grasp the intuition underlying the equivalent income concept, it is useful to introduce first a representation of individual preferences. The usual instrument, used by economists for this purpose, is the so-called indifference curve. This is the application at the individual level of the “social indifference curve” (the curved line) in Figure 1. Figure 3 represents two indifference curves: each curve connects all (income, health) combinations that are considered equally good by the individual. Combinations on a higher indifference curve constitute a better life. One interpretation of Figure 3 is that situation A describes the income and health of one individual (let’s call her Ann) and that situation B does the same for another individual (say, Bob). If one accepts our Principle 4, all points on the curve through A, that are by definition considered by Ann herself to be equally good, are also considered by society as equally good for her.

Let us assume first that both individuals agree on what is a good life or, equivalently, that they have the same preferences. In this case, Principle 4 requires us to accept that the well-being of Ann is greater than that of Bob, since both individuals would prefer to be in situation A rather than B. Note that this does *not* imply that Ann is necessarily happier than Bob. It is very possible that Ann comes from a rich family and has a long experience of being healthy – while Bob’s situation may have improved considerably compared to that of his deprived parents. The aspirations of Ann may then be much more ambitious – and she therefore may feel worse off than Bob, despite the fact that she would not be willing to change position with him. This is precisely a situation of adaptation of satisfaction to aspirations, as was described in the previous section.

Figure 3. Two individuals with the same preferences



The comparison between Ann and Bob in Figure 3 is relatively straightforward. The more challenging (but also more realistic) case is one in which both individuals have different ideas about what is important in life, i.e. they have different preferences. Figure 4 reflects such a case. Ann and Bob now disagree on the good life, which can be seen from their crossing indifference curves. Bob (in situation B) would in fact prefer to be in the situation of Ann (since the point A lies above his

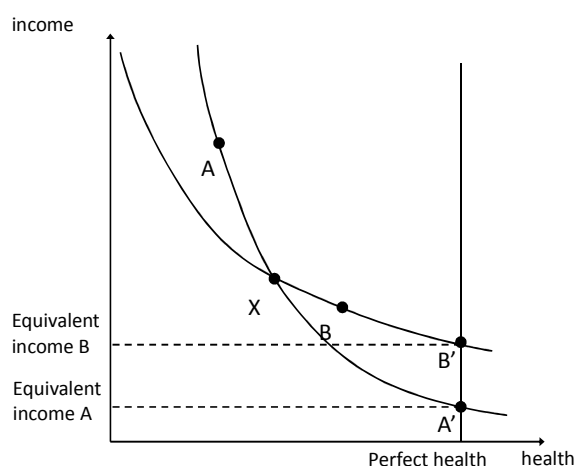
indifference curve), but at the same time Ann would prefer to be in the situation of Bob (since the point B is above her own indifference curve). How are we going to say which of the two individuals is worse or better off in such a case of mutual envy?

Furthermore, close inspection of the figure suggests an additional question. Suppose that both Ann and Bob were in the same situation X, in which they have the same income and the same health situation. However, as shown by the crossing indifference curves, Ann and Bob still have different ideas about what is important in life. Indeed, as the indifference curve of Ann is steeper compared to the indifference curve of Bob, health is relatively more important for her than it is for Bob. In other words, Ann is willing to give up more income for an improvement in her health. Can we draw the conclusion that both individuals are equally well off in situation X – or should we say that Ann is suffering more from not being healthy, and that she is therefore at a lower level of well-being? If we accept Principle 4, the latter conclusion seems to be more natural.

All these questions are pertinent ones, for which there are no easy answers. Yet, the idea of equivalent income is one natural approach to settle these issues. In our view it presents the most attractive method that is presently available, but there may be other unexplored alternatives that satisfy our basic six principles.

Let us recall once more our starting point: the choice of a well-being measure is *not* a metaphysical or a psychological question, but rather an ethical or political one. When we claim that Ann is better off than Bob, this means that someone who is concerned about inequality is justified to draw the conclusion that redistribution from Ann to Bob would be an improvement from the social point of view. Whereas it is common to think of redistribution in terms of income, it is not straightforward – or even possible – to redistribute health (or outcomes in other dimensions of life). Hence, a natural question to ask at this point is the following: under what conditions can we reduce the multiple dimensions of well-being to the income dimension only, i.e. under what conditions is it possible to state that a redistribution of income from Ann to Bob would indeed lead to a more equal distribution of well-being, or, equivalently, that Ann is better off than Bob if her income is larger? This is obviously not true in general. In Figure 4 there is no *a priori* reason to say that Ann is better off in situation A than Bob is in situation B. She is indeed richer, but at the same time she is also less healthy.

Now consider a situation in which Ann and Bob have the same suboptimal health. If both individuals are equally sick, can we then compare their well-being on the basis of their income alone? This is again not straightforward, since one individual may care more about being sick than the other (recall also our discussion of situation X in Figure 4). Let us therefore go further and consider a situation in which two individuals are not only equally healthy, in addition they are both perfectly healthy. Such a situation is represented in Figure 4 if we were to compare situations A' and B'. We suggest that in such a comparison between two individuals who are perfectly healthy, the individual with the largest income can be seen as better off. In other words, it seems natural to state that differences in the weight given to health by different individuals become irrelevant if they are both in perfect health anyhow. Take the individual in B' who has the highest income. Can he legitimately claim that he is worse-off than someone in A' with a smaller income, because he cares “less” about being healthy?

Figure 4. The concept of equivalent income

While we focused our example in Figure 3 and 4 on combinations of income and health, the reasoning also extends naturally to other non-income dimensions. From the previous discussion, two basic intuitions can be distilled. First, if we want to respect individual ideas about what is a good life, two situations that are seen by the individual as equally good also correspond to the same level of well-being for policy analysis. Second, if all individuals obtain their most preferred situation on a non-income dimension, the importance given to this dimension should not influence the ranking of their well-being. Obviously, these intuitions reflect normative positions, which should be judged on the basis of their ethical acceptability. Certainly the second one is debatable.¹⁷ However, once we accept them, we can immediately derive an interesting concept of individual well-being that can be made operational. This is the *equivalent income*.

Let us return to Figure 4 and assume that we have to compare the well-being of Ann in situation A with the well-being of Bob in B. Our first intuition implies that Ann reaches the same level of well-being in situation A and in A' and that Bob reaches the same level of well-being in situation B and B'. Our second intuition implies that A' and B' can be ranked on the basis of income only – these incomes are denoted in the figure as “equivalent income (for Ann in) A” and “equivalent income (for Bob in) B”. These equivalent incomes measure the well-being levels of the two individuals. In this case, it turns out that Ann is worse off in A than Bob is in B, despite the fact that Ann is richer. The explanation is clear: in situation A, Ann has a lower level of health and health is relatively important for her. In more general and abstract terms, we can define the equivalent income as follows.

Definition (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 he/she finds equally good as his/her initial situation.*

Note that the equivalent income crucially depends on the individual ideas about what is a good life. If both Ann and Bob were in the same situation X, the equivalent income of Ann would still be lower because she suffers more from poor health. In addition, equivalent income has all the pleasant

¹⁷ The second principle is *not* necessary to support the idea of equivalent income. Equivalent incomes can be calculated for any choice of reference values of the non-income dimensions (see, for example, Fleurbaey *et al.*, 2009). However, the choice of the “best” value as reference is an attractive choice. See Fleurbaey and Blanchet (2013) for an extensive discussion.

operational features of ordinary income. It is a monetary measure that can easily be interpreted in cardinal terms and that can be used without any problem in the computation of social welfare and inequality according to expressions (2) and (3). In fact, the difference between Ann's income in A and her equivalent income simply is her "willingness-to-pay" for perfect health. To some readers, the use of a monetary measure of well-being may seem inappropriate. They might even claim that it is a return to the money fetishism that we wanted to leave behind us when going "beyond GDP". These feelings are understandable, but they are misplaced. As the example makes clear, the ranking of well-being in terms of equivalent incomes may be very different from the income ranking. What really matters is not the monetary measurement, but the assumption of commensurability, i.e. the basic idea that it is meaningful to define trade-offs between the different dimensions and that the correct way to make these trade-offs is to respect the ideas on the good life held by the individuals themselves. The possibility to construct a one-dimensional synthetic indicator of individual well-being immediately follows from our Principle 4.

B. COMPUTING EQUIVALENT INCOMES

To compute equivalent incomes, we need information about the position of (a representative sample of) all individuals in society on a given list of relevant life dimensions (e.g. the list proposed by the European Statistical System and summarized in Table 1). Even if this is not straightforward, it is still the easy part. In addition, we also need information about individual preferences, i.e. about the weights given by individuals themselves to these different dimensions. In terms of Figures 3 and 4, this means that we need information about individual indifference curves. The derivation of preferences is a very lively topic of ongoing research, but promising results have been found in three directions.

First, for those dimensions about which individuals have some choice, their preferences can be revealed by observed behaviour, if we are willing to assume that their choices are based on correct information. The most straightforward application here is with labour market data (Bargain *et al.*, 2013). Second, since the difference between income and equivalent income equals the individual willingness-to-pay to be in the best possible situation on the non-income dimensions, use can be made of well-known techniques of stated preferences such as contingent valuation. There is presently a large body of experience with collecting this kind of information and it is also used widely in policy applications, for instance in the environmental and the health domains. Equivalent incomes have been calculated with this technique by Fleurbaey *et al.* (2013). A third method, starting from information about life satisfaction, has been applied by Fleurbaey *et al.* (2009) and, for the specific case of job characteristics, by Schokkaert *et al.* (2011). One of its main advantages is that it can be easily implemented with data from a survey that contains individual information about life dimensions and about life satisfaction. Since this is the method that will be applied in our own empirical application in this paper, we will discuss it in some more detail.

At first sight it may seem surprising that we rejected life satisfaction as a synthetic indicator of well-being and nevertheless use this information to calculate equivalent incomes. To understand that our position is in fact not as schizophrenic as it may at first seem, it is useful to distinguish between two sources of information that are present in satisfaction questions. First, they give information about the *level* of satisfaction of the individual. We argued above that this information on the satisfaction levels is influenced by aspirations and expectations and should therefore not be used as a synthetic

well-being indicator. Second, if we accept the reasonable assumption that the *relative importance* respondents attach to the different life dimensions is reflected in their overall judgment, then we can still derive from their answers useful information about the shape of the indifference curves in Figures 3 and 4. It is exactly this source of information that will be used in section 4 to calculate equivalent incomes.

A formal presentation may help to clarify our position further. Call y the income of the individual, x the list of relevant non-income dimensions of life, z a set of personal characteristics (that describe the individual, but are not part of the relevant dimensions of life, e.g. gender and age), and S subjective satisfaction. The satisfaction of individual i can then be written as:

$$(4) \quad S_i = \alpha + (\mu + \pi'z_i)\ln y_i + (\beta + \gamma'z_i)'x_i + \delta'z_i + \varepsilon_i,$$

where ε_i is a disturbance term, and $(\alpha, \mu, \pi, \beta, \gamma, \delta)$ are coefficients to be estimated. An increase in income (we take the logarithm of income to capture the phenomenon that additional income has a smaller effect on satisfaction when income gets larger¹⁸) and in the relevant life dimensions x increases satisfaction. An increase in z also affects satisfaction, but since z does not include relevant dimensions of life, we interpret it as capturing aspirations and expectations. Note that these individual characteristics also influence the effect of income and the other quality dimensions x on satisfaction S : this allows us to account for the possibility that individuals with different personal characteristics may have different ideas about what is important in life. Of course, how strong this effect is and in which direction it goes is an empirical matter.

We can now compute the equivalent income. Recall that by definition it 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 he or she finds equally good as his or her initial situation. If we indicate these best possible values by an upper bar and the equivalent income of individual i by y_i^* , we can write:

$$\begin{aligned} S_i &= \alpha + (\mu + \pi'z_i)\ln y_i + (\beta + \gamma'z_i)'x_i + \delta'z_i + \varepsilon_i = \\ &\alpha + (\mu + \pi'z_i)\ln y_i^* + (\beta + \gamma'z_i)'\bar{x} + \delta'z_i + \varepsilon_i, \end{aligned}$$

and therefore

$$(5) \quad y_i^* = y_i \exp \left[\left(\frac{\beta + \gamma'z_i}{\mu + \pi'z_i} \right)' (x_i - \bar{x}) \right]$$

This expression is easy to interpret. The equivalent income will increase with x_i and the importance of that increase is measured by the relative importance of x_i as compared to income. If the individual reaches the best possible value \bar{x} for all dimensions, the equivalent income becomes equal to the actual income (see also Figure 4). Personal characteristics z_i enter the expression (5) in so far as they affect the relative importance given by individual i to the various dimensions of life. By construction differences in aspirations (as captured by the coefficients δ) do not have an effect on equivalent income, nor do the idiosyncratic differences captured in the disturbance term ε_i .

¹⁸ See, for example, the empirical results in Oswald (2008). Introducing the logarithm of income does not only yield an attractive interpretation, it also improves the empirical fit of the regression.

C. FROM PRINCIPLES TO PRACTICAL APPLICATION

While the equivalent income may at first sight look like a rather abstract concept, it should be clear by now that it is in fact not difficult to operationalize. All the necessary information can easily be collected through a representative survey (such as SILC). The survey has to contain a number of questions on the relevant life dimensions (e.g. those proposed by the European Statistical System and summarized in Table 1). Depending on the method used to estimate preferences, one needs in addition sufficient information on the economic environment to estimate a structural behavioural model, or questions on the willingness-to-pay to be at a perfect level for the non-income dimensions, or just a standard question on subjective life satisfaction. For each of the three approaches (but least for the second) it would be preferable to work with a panel data set, to correct for individual-specific time-invariant characteristics such as personality traits.

None of these estimations are particularly difficult or revolutionary, and in each case there is already a great deal of experience, both from the research point of view and from the perspective of practical policy implications. The main bottleneck for further empirical applications is situated at the level of data collection. Nevertheless, we see no reason why the necessary information could not be collected on a regular basis.

4. DATA AND ESTIMATION PROCEDURE

To compute equivalent incomes for various European countries, we make use of the European Social Survey (ESS). The ESS is designed to chart the interaction between Europe's changing institutions and the attitudes, beliefs and behaviour patterns of its citizens. Since 2002, data has been collected every two years in more than thirty nations. For our purposes it is a useful data set as it contains information on a number of life dimensions and on life satisfaction. In our analysis we will focus on 2008 and 2010 (waves 4 and 5) of the survey. We do so for two reasons. First, this allows us to study the development of well-being during the turbulent period of the outbreak of the worldwide financial crisis.¹⁹ Second, in wave 4 the ESS method of collecting household income information has been considerably improved, which complicates comparisons with the earlier waves.

The ESS is not the ideal data set to compute equivalent incomes. Two drawbacks should be noted from the start. First, the income information in the ESS is rather crude and based on a single question. Household heads report their total household income by indicating the income decile to which they belong.²⁰ Second, the ESS is a repeated cross-section and not a panel survey, which makes it difficult to control for individual-specific time-invariant characteristics in the life satisfaction

¹⁹ As the survey was organized at the end of the calendar year, it is supposed to describe the situation of the individuals in 2008 and 2010.

²⁰ The country and time-specific cut-offs of these income deciles are taken from an external source. After converting the reported deciles to their corresponding monetary values (by taking the midpoint of each interval), some discrepancies remain between the ranking of the countries according to the average income in the survey and the well-established macro-figures. In addition, corrections for price differences have to be made to allow for comparisons between countries. Therefore we apply an uprating procedure of all incomes such that the country average total household income per capita coincides with the "Real net national income at the price levels and PPPs of 2005" as provided by the OECD on 28/1/2013. Appendix 1 provides more details on this uprating procedure.

regression. It is well-known, for example, that personality traits are important determinants of life satisfaction and that not controlling for them may lead to biased estimates of the other coefficients (see Ferrer-i-Carbonell and Frijters, 2004).

Within the European context, it would have been very natural to work with SILC in order to calculate equivalent incomes. SILC does indeed give a great deal of information on the relevant life dimensions. However, in the presently available waves, it does not contain sufficient information to estimate individual preferences. As soon as the survey will include a question on life satisfaction, it is perfectly suited to calculate equivalent incomes.²¹

Table 4. Dimensions included in the analysis

Life dimensions	Variable in ESS
Material living conditions	Total household income per capita (after uprating)
Health	1) Self-reported health 2) Dummy whether being hampered in daily activities by illness/disability/infirmity or mental problem
Productive and valued activities	Unemployment status
Leisure and social interactions	Indicator of how often the respondent meets socially with friends, relatives or colleagues.
Economic and physical security	Indicator of whether the respondent feels safe when walking alone in local area after dark

In Table 4 we summarize the life dimensions that are included in our analysis and how they are measured in the European Social Survey. A comparison with Table 1 shows that most of the dimensions listed by the European Statistical System are included, except “Education”, “Natural and living environment”, “Experience of life” and “Governance and basic rights”.²² We explain below why we did not include education as a life dimension.

[insert Table 5 about here]

Table 5 provides summary statistics for each of these variables for the 18 countries considered in our analysis. We include countries for which we have data on the key variables in both waves, leaving us with 15 EU-members and Switzerland, Norway and the Russian Federation.²³ The third column of Table 5 provides the average responses on the life-satisfaction question: “All things considered, how satisfied are you with your life as a whole nowadays?” Answers range from 0 (extremely dissatisfied) to 10 (extremely satisfied). Denmark (DK) stands out as the country with highest average life

²¹ An alternative dataset that would be useful for this exercise is the European Quality of Life Survey by Eurofound. At the time of writing this paper, the data for 2003 and 2007 were available, but the data for the third survey of 2011 were not (see, for example, Eurofound, 2012). We opted therefore to work with the more recent data from the European Social Survey, but comparisons across surveys are necessary methodological exercises in future work.

²² “Experience of life” and in particular happiness, could in principle be included in the analysis, as the ESS also includes a happiness question “Taking all things together, how happy would you say you are?”. After experimenting, we have decided not to take this variable as a dimension of life because of its very high correlation with life satisfaction. This common finding hints at the confusion between the evaluative question on life satisfaction and the affective question on happiness. See also Fleurbaey and Blanchet (2013).

²³ Countries included in the analysis are Belgium (BE), Switzerland (CH), Czech Republic (CZ), Germany (DE), Denmark (DK), Estonia (EE), Spain (ES), Finland (FI), France (FR), Great Britain (GB), Greece (GR), Hungary (HU), Netherlands (NL), Norway (NO), Poland (PL), Russian Federation (RU), Sweden (SE) and Slovenia (SI).

satisfaction and Hungary (HU) and the Russian Federation (RU) score lowest. By virtue of the uprating procedure described in Appendix 1, the average incomes in column four coincide with the “Real Net National Incomes” time series reported by the OECD. Norway (NO) is the richest country and Hungary the poorest. Columns five and six describe the health situation. On average, citizens in Greece (GR) are most healthy, as measured by both health variables.²⁴ Unemployment rates are given in column seven, with notable increases in unemployment figures between 2008 and 2010 for Spain (ES) and Greece. The next column presents average social interactions scores measured on a 1 to 7 scale. Lowest scores are obtained by the former communist countries (see also Howard, 2002). Column nine presents the average feeling of safety on a 1 to 4 scale, where lower numbers indicate countries that are perceived as more unsafe, such as Russia and Greece. Switzerland (CH) and, again, Norway perform best on this dimension. The final four columns present the percentage of occurrence of some socio-demographic characteristics in the sample: being younger than 48, being female, having enjoyed higher education or belonging to an ethnic minority. Estonia (EE) and the Russian Federation are ethnically the most heterogeneous countries of the sample. The bottom row of the table presents the unweighted averages across countries in the sample.

As described above, the first step to compute equivalent incomes involves the estimation of the life satisfaction regression, i.e. equation (4). After pooling observations across all countries and both waves, we have a dataset with about 52,000 observations. Using an ordered logit estimation to account for the ordinal nature of the responses on the life satisfaction questions, we obtain an overall pseudo R^2 of 0.085.²⁵ Table 6 presents the coefficients that are necessary to compute equivalent incomes. In our estimation exercise, various control variables have been included to capture aspirations and expectations of the respondents such as their household size, education, education (squared), gender, age, age (squared), marital status, dummies for being religious, urban, belonging to ethnic minority, and a time and country dummy.²⁶ The coefficients obtained for these control variables all stand to reason, but are not reported for the sake of brevity and because they are not needed to compute equivalent incomes (see equation 5).²⁷ In the first row of the first column of Table 6, one finds the coefficient of the logarithm of income of an individual in the reference group (older than 48, male, without higher education and not belonging to an ethnic minority). This coefficient (μ in expression (4)) is 0.380 and significant at the 0.1% level. The interaction effects (π) are given in the final four columns of the same row. Younger individuals (i.e. age below 48) have a lower coefficient of income (they care less about their household income), whereas individuals with higher education, women and members of an ethnic minority have a larger coefficient and hence care more. The coefficients of the other dimensions of life (β) are given in the next rows of Table 6. Individuals in the reference group who are healthy and not hampered by illnesses report higher life satisfaction, whereas the unemployed report a lower life satisfaction. Also more social interactions and feelings of better personal safety are associated with higher life satisfaction. The corresponding interaction effects (γ) are given in the next four columns. We can see, for instance, that female

²⁴ Although self-assessed health is a good predictor of, for example, mortality, it is well known that caution is needed with international comparisons (Jürges, 2007). We try to reduce the problem by introducing two different health variables, the second of which (about being hampered in daily activities) is more “objective” than self-assessed health.

²⁵ Estimating the same equation with ordinary least squares leads to very similar results (and an R^2 of 0.298).

²⁶ A specification that furthermore controls for political orientation (on a left-right scale) and attitude towards gays and lesbians as proxies for some personality traits leads to very similar results.

²⁷ They can be obtained from the authors on request.

respondents care less about being unemployed (the positive interaction coefficient 0.222 tempers the direct negative effect of unemployment, which is -0.834) and higher educated respondents care more about their income. It is clear that the method based on a life satisfaction regression cannot provide individual-specific coefficients for the dimensions of life. At best we can account for the heterogeneity between broad socio-demographic groups. Here we have considered 16 such groups and found already considerable disagreement on the relative importance of the dimensions of life. This finding makes our principle 4 stated in section 2 also empirically relevant.

The final necessary ingredient for the computation of the equivalent incomes, involves the best possible values in each of the non-monetary dimensions of life (\bar{x}). For the dimensions taken up in our analysis this is easy as the variable used to measure the outcomes of the individuals is bounded and the respondents express a clear and unanimous opinion on what is the best value. To be precise, we selected “very good” and not being hampered by illness as best values for the health dimension. Not being unemployed is selected as the best value in the unemployment dimension, meeting every day with friends is the best value for the social interaction dimension and not feeling unsafe the best value for the personal safety dimension.

Education has a positive but small effect on life satisfaction. This low economic significance of education is in line with, for example, the results in Fleurbaey *et al.* (2009). The education variable is a special and difficult case within our approach, because it affects life satisfaction in two ways. First, to some extent it can be considered as a relevant dimension of well-being. Fixing its best value is not obvious, however, since being better educated is – at least theoretically – not naturally bounded and, more importantly, it is not reasonable to assume that the “best” value for education is uniform for everyone. To illustrate, we have calculated for each socio-demographic group the best value (i.e. the peak for the inverted U-shaped effect of education on life satisfaction that is obtained from the coefficients on the linear and the quadratic terms, accounting for the interaction effects). For the young, male individuals who do not belong to an ethnic minority, the optimal years of education is about 23 years, whereas for the young female individuals who belong to an ethnic minority it is only 10 years. Remarkably, older female individuals from an ethnic minority are most satisfied with their life at an educational level equal to nil years. These “best” values make sense in the interpretation of education as a life dimension. In principle, it would therefore be possible to integrate education as an additional life dimension for the calculation of equivalent incomes. On the other hand, it can also be argued that education affects expectations and aspirations and should therefore be seen as being part of the vector z_i of conditioning variables. The problem is that our technique of estimating preferences through a subjective satisfaction regression does not allow us to distinguish these two effects empirically.²⁸ Each variable has to be classified in one and only one of the categories (life dimensions x_i or personal characteristics z_i). We have opted in the following calculations to treat education not as a life dimension, but as a variable influencing aspirations. We performed a sensitivity analysis, however. Given the rather small direct effect of education on life satisfaction, taking it up in the calculation of equivalent incomes does not change any of our substantial results.²⁹

²⁸ The problem does not occur with the other two methods of estimating preferences. Since each of these methods has its own weak and strong points, it would certainly be advisable to compare the results obtained with each of them. At this moment, however, there is no data set that allows us to do so.

²⁹ The results with education as a life dimension are available from the authors on request.

Table 6. Coefficients of dimensions and interaction effects in happiness regression

dimension	Direct effect in ref. group	young	female	higher educated	ethnic minority
Income per capita (log)	0.380*** (0.0218)	-0.0248* (0.0125)	0.0460+ (0.0239)	0.0395*** (0.0114)	0.0103 (0.0490)
Health (self assessed)	0.618*** (0.0206)	-0.0294 (0.0221)	0.00152 (0.0216)	-0.0763*** (0.0229)	-0.0743 (0.0478)
Health (hampered)	-0.176*** (0.0380)	0.0826+ (0.0437)	0.00564 (0.0427)	-0.0480 (0.0454)	-0.154 (0.102)
Unemployed	-0.834*** (0.0805)	0.0288 (0.0813)	0.222** (0.0749)	0.0118 (0.0857)	0.0135 (0.135)
Social Interaction	0.143*** (0.00987)	-0.00362 (0.0109)	0.0198+ (0.0105)	-0.00706 (0.0116)	0.0301 (0.0228)
Personal Safety	0.225*** (0.0208)	0.0168 (0.0207)	-0.0587** (0.0215)	-0.0222 (0.0223)	0.0435 (0.0449)

Standard errors in parentheses (+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$). Results from ordinary least squares estimation including as controls: household size, education, education squared, gender, age, age (squared), marital status, dummies for being religious, urban, belonging to ethnic minority, time and country.

5. WELL-BEING AND SOCIAL PROGRESS IN EUROPE: SOME FIRST RESULTS

The ultimate criterion to evaluate well-being (taking into account the various life dimensions and inequality) is given by eq. (2). Social welfare is measured by *SW*, progress (regress) is measured by the changes in *SW*. These “final” results are given in Tables 12-14. To facilitate the interpretation of these results, we first focus on average equivalent incomes and on inequality separately. Table 7 summarizes the main results for the average equivalent incomes. The first two columns present the results for 2008, the third and the fourth column those for 2010 and the two last columns show the yearly growth rates. In each case we give the results for monetary incomes and for equivalent incomes with the full list of dimensions summarized in Table 4.

[insert Table 7 about here]

The first column presents the average monetary incomes for 2008. These monetary incomes can also be interpreted as the “equivalent incomes” for the special case in which only household income per capita is taken as a relevant dimension of life. With our data, the average income coincides with the “real net national income” macro variable. The ranking of the countries is given in italics. Norway is the richest country in our sample, followed by the Netherlands (NL) and Sweden (SE). Hungary is the poorest country. The second column gives the average level of the equivalent incomes with all dimensions included. In 2008 the highest average equivalent income was reached by Switzerland and by the Scandinavian countries, while the citizens of Russia, Hungary, Estonia and Poland (PL) were worst-off. Adding dimensions necessarily lowers equivalent incomes (except in the unrealistic case in which a country reaches the “best” possible value for all the added dimensions). Therefore it does not make sense to compare the absolute numbers across columns. What *does* make sense is a comparison of the rankings of the countries within and across columns. The most striking differences between the two rankings are the worsening of the position of Germany (DE) and the Netherlands

and the improvement of the position of Denmark. Below we come back to the interpretation of these shifts.

The situation in 2010 (in the third and fourth column of Table 7) is very similar. This is reassuring, as we would not expect large structural changes in these average levels over a period of only two years. The last two columns of Table 7 show yearly growth rates between 2008 and 2010. With the exception of three countries (Germany, Poland and, most outspokenly, Switzerland) all countries suffered from negative growth rates when only income is considered as a dimension of life. In particular, Estonia and Greece are heavily hit by the financial crisis and the effects of a bursting real estate market bubble (in Estonia) and a government debt crisis (in Greece). The changes in average well-being are different however. In Belgium (BE), Spain, Slovenia (SI) and (especially) Sweden and Russia the negative income growth goes together with an improvement in average well-being. The development of average well-being is also more positive than that of income for Germany. On the other hand, the growth performance in terms of well-being is worse than that in terms of income for Switzerland, the Netherlands and France (FR). It is also interesting to compare the two countries with an extremely negative income growth: Estonia and Greece. While the Estonian performance improves a little when adding other dimensions, the Greek situation gets even worse. Growth in well-being is largest (and positive) in Sweden, Russia, Switzerland and Germany– it is lowest (and strongly negative) in Greece, the Czech Republic (CZ), France and Estonia.

Interpreting the (changes in) equivalent incomes is not straightforward. The numbers in Table 7 result from an exercise in which *first* individual equivalent incomes are computed for all individuals in the sample and *then* averages are taken over all the individuals in a given country. The weighting scheme is individual (or, better formulated, group-) specific (recall Table 6) and therefore compositional effects may play an important role. Suppose that the average health level in a country improves, but that this average increase results from an increase in health for individuals that care less (for example the young) and at the same time a decrease for individuals that care more. Average equivalent incomes can then decrease, even if average health in the country increases. The presence of these compositional effects is not a problem. On the contrary, accounting for them is the main purpose of the whole approach.

[insert Tables 8 and 9 about here]

Despite this caveat, it remains useful to look at the relative importance of the different dimensions. Some relevant numbers are shown in Tables 8 and 9 for 2008 and 2010 respectively. Let us look in some detail at the construction of Table 8 (Table 9 is analogous). The first column gives average monetary incomes and coincides with the first column in Table 7. The sixth column shows average equivalent incomes with all the dimensions included and coincides with the second column in Table 7. The columns in between present the hypothetical equivalent incomes when each time only one dimension is included (in addition to income). To be more explicit: the third column presents the average equivalent incomes when income and health are seen as life dimensions, the next column presents average equivalent incomes when income and unemployment are treated as life dimensions, and so on. This makes it possible to evaluate the effect of each of the dimensions, independently of what happens to the other dimensions. The right hand part of the Table gives for each of the dimensions separately and (in the last column) for all dimensions together the difference in percentages between average income and the respective values of average equivalent income

(i.e. well-being). As noted already before, by construction, introducing an additional dimension necessarily lowers the measure of well-being.

Since the results for 2008 and 2010 are very similar, we interpret Tables 8 and 9 together. Health turns out to have the largest effect on equivalent incomes. It gets a large weight in the preferences, and many respondents suffer from health problems. Very strong effects of ill-health are found for the East European countries and, more surprisingly, for Germany and the Netherlands. On the other hand, Greece seems to have a healthy population. To interpret these results correctly, it is important to keep in mind that we measure health by two separate variables, one of which is self-assessed health. Working with the SHARE dataset (a representative sample of the elderly), Jürges (2007) has found that precisely for the Germans and the Dutch there seems to be some discrepancy between these “subjective” indicators and objective health information. Yet, it is an open question from the viewpoint of measuring well-being whether self-assessed health does not contain relevant information that is missing in the objective data.

The second most important dimension is the quality of social interactions. Including social interactions has the smallest effect on equivalent incomes in Denmark, Spain and Norway. In these countries social interactions seem to be reasonably good, accounting for the compositional effects due to preference differences. The (lack of) quality of social interactions has a strongly negative effect in Greece and Hungary. Feelings of safety are somewhat less important. The result for unemployment is striking: increasing unemployment has a rather minor effect on *average* well-being, mainly because it only hits the unemployed subpopulation. The largest negative effects are found in Greece, Hungary and Spain.

The relative importance of all the dimensions together can be read from the last column. The smaller the absolute value of the negative numbers in that column, the better the relative performance of that country in terms of the non-income dimensions. Good performers are Switzerland, Denmark, Norway and Sweden. Poor performing countries are the Czech Republic, Estonia, Hungary, Poland, Russia and Slovenia. The overall performance of Germany and the Netherlands is also relatively poor, but this is mainly due to the health effect.

The picture of relative stability in Tables 8 and 9 may seem incongruent with the sometimes large growth rates that were reported in Table 7. Note that the same absolute change in equivalent income leads to larger growth rates for countries at a low level of well-being. The growth rates in Table 7 reflect the combination of *changes* in all the dimensions, including the respective compositional effects. Still, the most striking results stand to reason. Take the example of France, where the growth in average well-being is strongly negative (and much more negative than the income decrease). When looking at Table 5, France is the only country (except for Greece) where all the non-income indicators get worse. Even if all the separate effects may seem rather small on their own, the overall effect can then be substantial.

In our discussion of principle 6 in section 2, we argued that focusing on the average performance in a country remains blind for the distribution of well-being. Let us therefore now take a second step and analyze the inequality in our well-being measure. Tables 10 and 11 give the results for 2008 and 2010 respectively. We compare the inequality in equivalent incomes with traditional income

inequality for two values of p .³⁰ Recall that when p is set equal to 2, we obtain the well-known Gini coefficient. The value $p = 5$ corresponds to a large degree of bottom-sensitivity, i.e. a strong focus on what happens to the people with the lowest (equivalent) incomes. Since the picture is rather similar for 2008 and 2010, we focus on the former year.

Let us first consider the left hand part of the table focusing on income inequality.³¹ Again we present the ranks in italics, but now higher ranks reflect more unequal countries – a lower rank therefore indicating again a “better” situation. The Czech Republic and the Scandinavian countries have the most equal income distribution. Income inequality is largest in Great Britain, Switzerland, Poland and Russia. The right hand part of Table 10 shows the inequality in well-being. The most striking fact is the spectacular increase in inequality for all countries, showing that there is indeed a strong phenomenon of cumulative deprivation. Inequality in other dimensions does not compensate for income inequality, but increases overall inequality considerably. There are also shifts in the relative positions of the countries. The Scandinavian countries remain at the top, but for other countries the differences are quite dramatic. Switzerland and Great Britain (GB), for instance, are (relative to other countries) less unequal in equivalent incomes compared to standard incomes (although the inequality in Great Britain remains high with equivalent incomes also). The Netherlands do remarkably well, especially when we focus on the worst-off by increasing the bottom sensitivity (p) of the inequality measure. The Eastern European countries (the Czech Republic, Hungary, Slovenia and Estonia) are relatively to the other countries more unequal when we include the non-income dimensions in our measure of well-being.

[insert Table 10 and 11 about here]

We now have all the building blocks to construct the overall measure of social welfare. As defined in equation (2), we combine in a multiplicative way the information on average (equivalent) incomes as given in Table 7 with the information on inequality from Tables 10 and 11, to obtain a distribution-sensitive measure of social welfare. These results are presented in Tables 12 and 13 for 2008 and 2010 respectively. The yearly growth rates are shown in Table 14. The columns with $p = 1$ simply repeat the corresponding results for the averages, since $p = 1$ corresponds to the utilitarian perspective that focuses on average equivalent income. We include them nevertheless for the sake of comparison. This comparison immediately yields a surprising result. Introducing distribution-sensitivity does indeed change the relative ranking of some countries, but these changes are rather minor and they are more outspoken when we only focus on income compared to the situation in which we also include the other dimensions. The explanation is that the relative differences in the averages are much larger for equivalent incomes than for traditional incomes (compare the columns with $p = 1$) and therefore the differences in M have a much larger effect on social welfare, as given by equation (2). This suggests that the differences when moving from incomes to equivalent incomes should be mainly driven by the average levels. This is indeed what we find. Some countries do considerably better in terms of equivalent incomes than in terms of incomes: Switzerland, Denmark, Great-Britain, Poland, even Greece. Some do worse: Germany and the Netherlands.

³⁰ We also show the results for $p = 1$, but these are of course trivial, since inequality is then zero by assumption.

³¹ The Gini coefficients in Tables 10-11 do not correspond perfectly to the Gini coefficients obtained from macro data. Remember that the income data in the European Social Survey are not perfect (see Appendix 1).

[insert Tables 12 and 13 about here]

Looking at the country rankings for social welfare as defined in equation (2), i.e. the right hand part of Tables 12 and 13, we get the (unsurprising) result that social welfare is largest in the Scandinavian countries and in Switzerland, followed by Great Britain, Belgium and the Netherlands. Note that Great Britain does relatively worse when we strengthen the concern for the poor, i.e. increase the bottom-sensitivity in our inequality measure. Social welfare is lowest in the Eastern European countries (the Czech Republic, Poland, Estonia, Russia and Hungary).

Finally, in Table 14, we show the yearly growth rate in social welfare. Note that there are large differences between the country ranking based on growth figures and the country ranking based on the overall level of well-being reached. The latter is much more robust and stable. Yet, with due caution, it remains interesting to look also at the growth figures. Since we commented already on the differences between average income growth and average growth in well-being (the numbers given in the columns with $p=1$), we will now focus on the effect of increasing the weight given to the worst-off in the right hand part of the table. Some countries do much better when we evaluate their performance with a social welfare function that gives a larger weight to distributional issues: Belgium, Switzerland and Hungary. Some do worse: Germany and Great-Britain. Moreover, the growth results for Spain are very strongly negative and we observe a really dramatic negative development in Greece (-21.7%). The financial crisis has obviously been especially severe for the worst-off groups in Spain and Greece and this comes out most prominently when looking at a rich measure of well-being in a distribution-sensitive way.

[insert Table 14 about here]

Until now we focused on inter-country comparisons. One can of course also zoom in on specific countries, although this would ideally require an in-depth analysis accounting for the compositional effects related to the differential development of the dimensions for socioeconomic groups with different preferences. Let us nevertheless give three examples. The first is Greece. Although subjective health in Greece is above average, it is low in the ranking of average equivalent incomes both in 2008 and in 2010. Between these two years it had the largest negative growth in equivalent incomes (-7.86 %). When including distributional considerations its growth rate becomes even more negative, and it is mainly the worst-off in society that are hit most severely. We pointed already to the dramatic social regress between 2008 and 2010 for a bottom-sensitive social welfare function. Next, consider Belgium. Belgium is just below the top (about the 6th or 7th rank) when we consider the level of well-being – and it performs better for equivalent incomes than for traditional incomes. In fact, while it experienced negative income growth between 2008 and 2010, its average equivalent income slightly increased. Inequality in equivalent incomes is relatively low and especially the individuals at the lowest level of well-being are reasonably well protected. This has a positive effect on its performance when this is evaluated with a distribution-sensitive social welfare function. Finally, let us look at Germany. Its average income level is slightly above the Belgian one, but its equivalent income is lower, both in 2008 and in 2010. In fact, its overall ranking in terms of well-being is considerably less favourable than its ranking in terms of income. This is mainly due to a worse score for subjective health (recall however the caveats mentioned above). Moreover, Germany has larger inequality, both in incomes and in well-being. Between 2008 and 2010 it had positive growth rates when we only consider incomes or average well-being – it had negative growth

in well-being when we take the distribution into account. This is especially true for a social welfare function with an outspoken concern for the weakest groups in society. It is not very meaningful to look in this way at all the countries, nor should one forget the relative fragility of our dataset. It seems clear, nevertheless, that the notion of well-being can be made operational in an attractive way.

6. CONCLUSION

With this paper we wanted to show that it is possible to calculate measures of the level of well-being and its inequality in a coherent way by making use of data that can easily be collected with a representative questionnaire study. This is not to say that our empirical results are beyond doubt. Let us therefore state clearly the four different “levels” in our reasoning. At a first level, one finds the basic principles, in which we strongly believe. Two ideas are especially important. In our view, a satisfactory index of social well-being has to account for the fact of life that the weights attached to the different dimensions are not the same across different individuals. Moreover, the construction of a synthetic index of well-being is desirable. Such a synthetic index is needed to capture the important phenomenon of cumulative deprivation. Of course, other observers may have different ethical views, e.g. on the importance of subjective happiness. There is room for debate, but this debate should focus on the ethical foundation of the principles, rather than on the empirical implementation.

At a second level, we proposed the idea of equivalent income. To the best of our knowledge, equivalent income is the most attractive measure of well-being satisfying our basic principles. Its main weakness is the justification of the reference values. It is not impossible (and even likely) that other approaches will be developed in the future.

Equivalent incomes can be made operational with different techniques. This is the third level. In this paper we applied the subjective satisfaction method, but this method has its weaknesses. It can only capture group-wise differences in preferences (and not the differences between individuals) and it has difficulties to distinguish between the “well-being” and the “aspirational” effects of specific variables. In the future, the results with different techniques should be compared and put together to get a more robust picture of well-being.

Finally, at the lowest level, we situate our own empirical application with data from the European Social Survey. These data are far from perfect and therefore our empirical results should be taken with a grain of salt and interpreted very cautiously. What is important, however, is to realize that “measuring well-being” taking multiple life dimensions and inequality into account is *not* a mission impossible. Building some additional questions into representative surveys such as SILC would make it possible to collect all the necessary information in a straightforward way. In a first stage, it will already be an important step forward to have a question on life satisfaction in the survey. In a later stage it would even be better if room could be made for questions on willingness-to-pay, as this would make it possible to compare the measures of well-being obtained with different techniques. While there are many open questions left, the direction that can be taken to answer them is clearly sketched.

We have built into our exercise the possibility of different degrees of inequality aversion – ranging from completely disregarding inequality at one extreme to looking only at the poorest at the other extreme. Sensitivity analysis with respect to this parameter allows for an open debate about its implications. The idea of sensitivity analysis can be exploited further. More specifically, it would be interesting to build in a sensitivity analysis with respect to the life dimensions that are included in the measurement exercise. As a matter of fact, if one includes “affective happiness” as one of the life dimensions, the happiness approach can be integrated in the sensitivity analysis in a convenient way. A precondition for this is the development of robust measures of satisfaction that make it possible to distinguish its cognitive and affective components.

We have emphasized throughout this paper that the choice of a well-being measure for policy evaluation is an ethical and political question. Normative views may diverge, and it is therefore meaningful to compare and discuss the results obtained with different approaches. This should result in a political debate about the content of the arguments within a coherent theory of justice. Justice remains important in society even if only a minority of the population care about it. Our claim that individual preferences about life dimensions should be respected is an ethical position and is not based on these individual preferences themselves. It is crucial to distinguish these two layers in all discussions about measuring well-being and social progress.

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8. APPENDIX 1. UPDATING PROCEDURE FOR TOTAL HOUSEHOLD INCOMES

The income information in ESS is based on the following question “please tell me which letter describes your household's total income, after tax and compulsory deductions, from all sources? If you don't know the exact figure, please give an estimate.” To answer the question, the respondents make use of a country and wave specific showcard that contains 10 decile values estimated on an alternative data source (often SILC or administrative data). We have taken several steps to construct incomes based on these reported letters.

In the first step, every letter is converted to its corresponding monetary value. For the first nine deciles, we selected the midpoint of each decile, assuming an approximately uniform distribution within each decile. Things are more intricate for the top decile, as that is defined as “y or up”, where y denotes the decile value of the 10th decile. We select the monetary value corresponding to the top decile by searching on a fine grid for the monetary value that leads to the equivalized income distribution with the Gini coefficient which is closest to the Gini coefficient of SILC in 2008.³² For most countries we could select a monetary value for the top decile such that the Gini corresponds very well to the external source. Yet, for Czech Republic, Greece and Norway in 2008 the income distribution used in this analysis underestimates the inequality, whereas for Slovenia inequality is too high. In 2010, the figures for Denmark, France, the Netherlands and Slovenia are based on underestimations of inequality and those for Norway are too large. Yet, the discrepancies between the Gini coefficient used here and the Gini coefficient from SILC overall remain reasonable.

In the second step, the obtained income distribution is uprated, such that the average corresponds to the “Real net national income at the price levels and PPPs of 2005” as provided by the OECD.³³ This uprating corrects for missing income components and price differences across the different countries and waves. Note that this uprating leads by construction to a perfect correspondence between the average income and the macro-figures and that it does not affect the (relative) Gini coefficient. Moreover, as the specification of the happiness equation (expression 4) includes income after a logarithmic transformation and time and country dummies, the coefficient of income is not affected by the uprating.

9. TABLES

³² Downloaded on 31 January 2013 from the Eurostat website
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12

³³ Downloaded on 28 January 2013 from the OECD website
http://www.oecd-ilibrary.org/economics/real-net-national-income_2074384x-table16

Table 5. Summary statistics of key variables

Cntry	Year	Satisf. [0..10]	Income	Health [1..5]	Hamper. (in %)	Unempl. (in %)	Social [1..7]	Safe [1..4]	Young (in %)	Female (in %)	High. Educ (in %)	Minority (in %)
BE	2008	7,27	27783	3,94	22,3%	5,4%	5,16	3,00	54,9%	50,9%	32,4%	4,1%
BE	2010	7,51	27477	3,95	22,7%	5,5%	5,23	3,02	53,4%	51,9%	39,7%	3,9%
CH	2008	7,96	30300	4,17	17,7%	2,8%	5,22	3,28	57,2%	53,5%	26,6%	9,0%
CH	2010	8,14	34757	4,13	18,1%	2,1%	5,22	3,26	51,7%	48,7%	29,5%	6,6%
CZ	2008	6,65	18287	3,74	28,1%	4,4%	4,77	2,77	57,3%	51,3%	12,0%	2,8%
CZ	2010	6,41	16729	3,74	25,7%	6,1%	4,70	2,77	60,5%	49,0%	22,8%	2,7%
DE	2008	6,95	28933	3,67	27,5%	4,7%	4,78	3,03	50,1%	46,6%	35,4%	4,7%
DE	2010	7,26	28986	3,63	28,2%	3,9%	4,90	3,02	52,5%	48,5%	32,6%	4,6%
DK	2008	8,52	29171	4,08	26,9%	2,4%	5,42	3,28	47,8%	50,4%	39,8%	3,1%
DK	2010	8,35	28162	4,05	25,6%	4,4%	5,49	3,35	49,9%	48,7%	37,1%	2,7%
EE	2008	6,20	15699	3,40	25,6%	5,2%	4,54	2,76	51,5%	57,6%	36,6%	21,1%
EE	2010	6,52	12999	3,45	27,9%	6,1%	4,24	2,90	49,5%	59,7%	41,6%	13,3%
ES	2008	7,31	23326	3,82	15,4%	6,1%	5,45	2,92	58,7%	51,8%	23,3%	3,2%
ES	2010	7,30	22282	3,71	14,9%	11,9%	5,33	3,06	57,6%	51,5%	28,0%	3,0%
FI	2008	7,94	27696	3,80	31,9%	3,4%	5,09	3,25	50,2%	50,9%	30,6%	1,5%
FI	2010	7,94	25828	3,78	33,9%	5,1%	5,09	3,29	48,1%	51,5%	39,1%	1,4%
FR	2008	6,35	26593	3,82	21,9%	5,5%	5,22	3,08	55,6%	54,0%	30,8%	4,1%
FR	2010	6,34	25779	3,80	22,0%	6,5%	5,13	3,03	51,2%	52,3%	26,3%	4,6%
GB	2008	7,08	31142	3,97	21,6%	4,3%	4,99	2,80	56,5%	52,4%	44,0%	7,9%
GB	2010	7,17	29794	3,93	24,2%	5,3%	4,98	2,91	52,8%	54,6%	31,8%	8,3%
GR	2008	6,06	21938	4,33	11,7%	9,1%	4,17	2,64	65,6%	53,9%	24,6%	4,6%
GR	2010	5,71	19388	4,22	12,3%	11,8%	3,90	2,55	57,2%	55,6%	21,9%	5,9%
HU	2008	5,29	13887	3,42	30,2%	8,3%	3,80	2,71	52,1%	53,7%	20,1%	5,4%
HU	2010	5,84	13244	3,45	30,5%	6,4%	3,67	2,72	52,1%	54,2%	23,5%	4,7%
NL	2008	7,69	31789	3,89	25,3%	1,7%	5,42	2,98	52,0%	51,3%	31,9%	6,7%
NL	2010	7,77	30497	3,82	26,9%	2,4%	5,40	3,01	50,6%	53,1%	30,0%	5,8%
NO	2008	7,89	43027	4,04	24,2%	1,4%	5,48	3,40	57,4%	47,9%	43,8%	4,0%
NO	2010	7,93	41706	4,04	24,6%	3,8%	5,56	3,38	54,8%	50,4%	43,6%	4,9%
PL	2008	6,87	14262	3,62	27,6%	4,6%	4,28	3,03	56,3%	52,8%	21,9%	1,6%
PL	2010	7,00	15038	3,68	26,7%	6,3%	4,29	3,07	56,5%	51,9%	24,3%	1,2%
RU	2008	5,47	14367	3,22	33,0%	4,5%	4,42	2,65	59,0%	57,6%	52,6%	17,4%
RU	2010	5,70	13020	3,31	30,8%	5,3%	4,49	2,79	59,7%	57,8%	51,9%	16,1%
SE	2008	7,86	31161	4,03	27,3%	3,0%	5,38	3,25	52,9%	49,8%	26,3%	3,1%
SE	2010	7,91	30379	4,04	27,5%	3,7%	5,41	3,25	50,0%	52,0%	37,3%	3,0%
SI	2008	6,93	22199	3,57	30,2%	3,8%	4,49	3,14	56,1%	53,7%	20,8%	2,2%
SI	2010	6,97	20205	3,65	30,2%	6,1%	4,60	3,25	51,7%	53,5%	20,5%	2,5%
average	2008	7,02	25087	3,81	24,9%	4,5%	4,89	3,00	55,1%	52,2%	30,8%	5,9%
	2010	7,10	24237	3,80	25,2%	5,7%	4,87	3,04	53,3%	52,5%	32,3%	5,3%

Table 7. Average (Equivalent) Incomes and growth between 2008 and 2010 (ranks in italics)

Country	2008		2010		Growth	
	Income	Equi. Inc.	Income	Equi. Inc.	Income	Equi. Inc.
BE	27783 <i>8</i>	4179 <i>7</i>	27477 <i>8</i>	4285 <i>6</i>	-0,55% <i>4</i>	1,27% <i>6</i>
CH	30300 <i>5</i>	7139 <i>3</i>	34757 <i>2</i>	7776 <i>2</i>	7,35% <i>1</i>	4,46% <i>3</i>
CZ	18287 <i>14</i>	1997 <i>14</i>	16729 <i>14</i>	1719 <i>14</i>	-4,26% <i>14</i>	-6,96% <i>17</i>
DE	28933 <i>7</i>	3069 <i>11</i>	28986 <i>6</i>	3272 <i>10</i>	0,09% <i>3</i>	3,31% <i>4</i>
DK	29171 <i>6</i>	7505 <i>2</i>	28162 <i>7</i>	6915 <i>4</i>	-1,73% <i>8</i>	-3,93% <i>13</i>
EE	15699 <i>15</i>	1277 <i>16</i>	12999 <i>18</i>	1116 <i>16</i>	-8,60% <i>18</i>	-6,31% <i>16</i>
ES	23326 <i>11</i>	3185 <i>10</i>	22282 <i>11</i>	3245 <i>11</i>	-2,24% <i>11</i>	0,94% <i>8</i>
FI	27696 <i>9</i>	4151 <i>8</i>	25828 <i>9</i>	3825 <i>8</i>	-3,37% <i>13</i>	-3,93% <i>12</i>
FR	26593 <i>10</i>	4120 <i>9</i>	25779 <i>10</i>	3604 <i>9</i>	-1,53% <i>6</i>	-6,26% <i>15</i>
GB	31142 <i>4</i>	5603 <i>5</i>	29794 <i>5</i>	5309 <i>5</i>	-2,16% <i>10</i>	-2,62% <i>9</i>
GR	21938 <i>13</i>	3022 <i>12</i>	19388 <i>13</i>	2547 <i>12</i>	-5,81% <i>17</i>	-7,86% <i>18</i>
HU	13887 <i>18</i>	775 <i>17</i>	13244 <i>16</i>	732 <i>18</i>	-2,32% <i>12</i>	-2,76% <i>10</i>
NL	31789 <i>2</i>	4532 <i>6</i>	30497 <i>3</i>	4153 <i>7</i>	-2,03% <i>9</i>	-4,18% <i>14</i>
NO	43027 <i>1</i>	10870 <i>1</i>	41706 <i>1</i>	10128 <i>1</i>	-1,54% <i>7</i>	-3,41% <i>11</i>
PL	14262 <i>17</i>	1346 <i>15</i>	15038 <i>15</i>	1404 <i>15</i>	2,72% <i>2</i>	2,15% <i>5</i>
RU	14367 <i>16</i>	756 <i>18</i>	13020 <i>17</i>	827 <i>17</i>	-4,69% <i>16</i>	4,72% <i>2</i>
SE	31161 <i>3</i>	6431 <i>4</i>	30379 <i>4</i>	7224 <i>3</i>	-1,25% <i>5</i>	6,16% <i>1</i>
SI	22199 <i>12</i>	2474 <i>13</i>	20205 <i>12</i>	2522 <i>13</i>	-4,49% <i>15</i>	0,97% <i>7</i>

Table 8. Dimension contributions to equivalent income in 2008

Country	Income	Health	Unempl.	Social.	Safety	Equi.Inc.	Health	Unempl.	Social.	Safety	Equi.Inc.
BE	27783	10271	26905	15877	18536	4179	-63%	-3%	-43%	-33%	-85%
CH	30300	14816	29876	17337	23128	7139	-51%	-1%	-43%	-24%	-76%
CZ	18287	5948	17886	8983	10440	1997	-67%	-2%	-51%	-43%	-89%
DE	28933	8161	28321	14346	19943	3069	-72%	-2%	-50%	-31%	-89%
DK	29171	14327	28847	18061	23000	7505	-51%	-1%	-38%	-21%	-74%
EE	15699	3730	15281	7686	9481	1277	-76%	-3%	-51%	-40%	-92%
ES	23326	7860	22443	14155	14785	3185	-66%	-4%	-39%	-37%	-86%
FI	27696	9249	27161	15167	20803	4151	-67%	-2%	-45%	-25%	-85%
FR	26593	8994	25947	15525	18954	4120	-66%	-2%	-42%	-29%	-85%
GB	31142	14983	30591	17184	20279	5603	-52%	-2%	-45%	-35%	-82%
GR	21938	12689	20674	8444	12622	3022	-42%	-6%	-62%	-42%	-86%
HU	13887	2967	13256	5128	7925	775	-79%	-5%	-63%	-43%	-94%
NL	31789	10049	31565	19666	20917	4532	-68%	-1%	-38%	-34%	-86%
NO	43027	19516	42700	27379	34961	10870	-55%	-1%	-36%	-19%	-75%
PL	14262	3912	13969	6086	9439	1346	-73%	-2%	-57%	-34%	-91%
RU	14367	2444	14100	6643	8194	756	-83%	-2%	-54%	-43%	-95%
SE	31161	13408	30663	18727	23543	6431	-57%	-2%	-40%	-24%	-79%
SI	22199	5951	21885	10568	15575	2474	-73%	-1%	-52%	-30%	-89%

Table 9. Dimension contributions to equivalent income in 2010

Country	Income	Health	Unempl.	Social.	Safety	Equi.Inc.	Health	Unempl.	Social.	Safety	Equi.Inc.
BE	27477	10113	26601	15900	18530	4285	-63%	-3%	-42%	-33%	-84%
CH	34757	16868	34221	19897	26052	7776	-51%	-2%	-43%	-25%	-78%
CZ	16729	5347	16104	8077	9612	1719	-68%	-4%	-52%	-43%	-90%
DE	28986	7957	28563	14998	20309	3272	-73%	-1%	-48%	-30%	-89%
DK	28162	13558	27430	17496	22518	6915	-52%	-3%	-38%	-20%	-75%
EE	12999	3229	12685	5653	8342	1116	-75%	-2%	-57%	-36%	-91%
ES	22282	7478	21019	13648	15365	3245	-66%	-6%	-39%	-31%	-85%
FI	25828	8632	24995	14237	19757	3825	-67%	-3%	-45%	-24%	-85%
FR	25779	8677	24919	14544	18288	3604	-66%	-3%	-44%	-29%	-86%
GB	29794	13370	29098	16184	20297	5309	-55%	-2%	-46%	-32%	-82%
GR	19388	10719	18339	7449	10841	2547	-45%	-5%	-62%	-44%	-87%
HU	13244	2989	12667	4578	7617	732	-77%	-4%	-65%	-42%	-94%
NL	30497	9374	30045	18419	20303	4153	-69%	-1%	-40%	-33%	-86%
NO	41706	18761	40661	26896	33674	10128	-55%	-3%	-36%	-19%	-76%
PL	15038	4339	14589	6206	10079	1404	-71%	-3%	-59%	-33%	-91%
RU	13020	2400	12859	6326	7987	827	-82%	-1%	-51%	-39%	-94%
SE	30379	13863	29967	19048	23470	7224	-54%	-1%	-37%	-23%	-76%
SI	20205	6114	19688	9880	15164	2522	-70%	-3%	-51%	-25%	-88%

Table 10. Inequality of incomes and equivalent incomes in 2008 for various values of the bottom sensitivity parameter (ranks in italics)

Country	Income			Equivalent income		
	$\rho = 1$	$\rho = 2$	$\rho = 5$	$\rho = 1$	$\rho = 2$	$\rho = 5$
BE	0,00 <i>1</i>	0,31 <i>7</i>	0,54 <i>7</i>	0,00 <i>1</i>	0,68 <i>5</i>	0,92 <i>5</i>
CH	0,00 <i>1</i>	0,37 <i>17</i>	0,59 <i>16</i>	0,00 <i>1</i>	0,68 <i>6</i>	0,92 <i>6</i>
CZ	0,00 <i>1</i>	0,25 <i>1</i>	0,45 <i>1</i>	0,00 <i>1</i>	0,72 <i>13</i>	0,94 <i>13</i>
DE	0,00 <i>1</i>	0,34 <i>13</i>	0,57 <i>11</i>	0,00 <i>1</i>	0,71 <i>11</i>	0,94 <i>10</i>
DK	0,00 <i>1</i>	0,27 <i>3</i>	0,49 <i>3</i>	0,00 <i>1</i>	0,64 <i>1</i>	0,91 <i>4</i>
EE	0,00 <i>1</i>	0,34 <i>11</i>	0,57 <i>12</i>	0,00 <i>1</i>	0,76 <i>15</i>	0,96 <i>15</i>
ES	0,00 <i>1</i>	0,35 <i>15</i>	0,57 <i>13</i>	0,00 <i>1</i>	0,72 <i>12</i>	0,94 <i>11</i>
FI	0,00 <i>1</i>	0,29 <i>6</i>	0,52 <i>5</i>	0,00 <i>1</i>	0,69 <i>7</i>	0,93 <i>7</i>
FR	0,00 <i>1</i>	0,33 <i>10</i>	0,56 <i>8</i>	0,00 <i>1</i>	0,70 <i>9</i>	0,93 <i>8</i>
GB	0,00 <i>1</i>	0,39 <i>18</i>	0,65 <i>18</i>	0,00 <i>1</i>	0,71 <i>10</i>	0,94 <i>12</i>
GR	0,00 <i>1</i>	0,35 <i>14</i>	0,56 <i>10</i>	0,00 <i>1</i>	0,70 <i>8</i>	0,93 <i>9</i>
HU	0,00 <i>1</i>	0,29 <i>5</i>	0,53 <i>6</i>	0,00 <i>1</i>	0,77 <i>18</i>	0,97 <i>18</i>
NL	0,00 <i>1</i>	0,32 <i>8</i>	0,56 <i>9</i>	0,00 <i>1</i>	0,66 <i>4</i>	0,90 <i>1</i>
NO	0,00 <i>1</i>	0,27 <i>2</i>	0,48 <i>2</i>	0,00 <i>1</i>	0,64 <i>1</i>	0,91 <i>2</i>
PL	0,00 <i>1</i>	0,36 <i>16</i>	0,60 <i>17</i>	0,00 <i>1</i>	0,77 <i>16</i>	0,96 <i>16</i>
RU	0,00 <i>1</i>	0,34 <i>12</i>	0,58 <i>15</i>	0,00 <i>1</i>	0,76 <i>14</i>	0,95 <i>14</i>
SE	0,00 <i>1</i>	0,28 <i>4</i>	0,50 <i>4</i>	0,00 <i>1</i>	0,65 <i>3</i>	0,91 <i>3</i>
SI	0,00 <i>1</i>	0,32 <i>9</i>	0,58 <i>14</i>	0,00 <i>1</i>	0,77 <i>17</i>	0,96 <i>17</i>

Table 11. Inequality of incomes and equivalent incomes in 2010 for various values of the bottom sensitivity parameter (ranks in italics)

Country	Income			Equivalent income		
	$\rho = 1$	$\rho = 2$	$\rho = 5$	$\rho = 1$	$\rho = 2$	$\rho = 5$
BE	0,00 <i>1</i>	0,31 <i>8</i>	0,52 <i>5</i>	0,00 <i>1</i>	0,66 <i>5</i>	0,91 <i>3</i>
CH	0,00 <i>1</i>	0,34 <i>14</i>	0,57 <i>13</i>	0,00 <i>1</i>	0,65 <i>3</i>	0,91 <i>3</i>
CZ	0,00 <i>1</i>	0,27 <i>1</i>	0,46 <i>1</i>	0,00 <i>1</i>	0,73 <i>10</i>	0,95 <i>12</i>
DE	0,00 <i>1</i>	0,33 <i>11</i>	0,56 <i>9</i>	0,00 <i>1</i>	0,73 <i>11</i>	0,95 <i>9</i>
DK	0,00 <i>1</i>	0,28 <i>3</i>	0,51 <i>4</i>	0,00 <i>1</i>	0,64 <i>2</i>	0,91 <i>5</i>
EE	0,00 <i>1</i>	0,34 <i>13</i>	0,57 <i>11</i>	0,00 <i>1</i>	0,78 <i>18</i>	0,96 <i>17</i>
ES	0,00 <i>1</i>	0,38 <i>18</i>	0,61 <i>17</i>	0,00 <i>1</i>	0,74 <i>12</i>	0,95 <i>13</i>
FI	0,00 <i>1</i>	0,29 <i>4</i>	0,52 <i>6</i>	0,00 <i>1</i>	0,68 <i>7</i>	0,93 <i>7</i>
FR	0,00 <i>1</i>	0,33 <i>10</i>	0,57 <i>12</i>	0,00 <i>1</i>	0,70 <i>8</i>	0,93 <i>7</i>
GB	0,00 <i>1</i>	0,36 <i>16</i>	0,62 <i>18</i>	0,00 <i>1</i>	0,71 <i>9</i>	0,95 <i>11</i>
GR	0,00 <i>1</i>	0,36 <i>17</i>	0,60 <i>15</i>	0,00 <i>1</i>	0,75 <i>13</i>	0,96 <i>14</i>
HU	0,00 <i>1</i>	0,30 <i>6</i>	0,53 <i>7</i>	0,00 <i>1</i>	0,76 <i>17</i>	0,96 <i>18</i>
NL	0,00 <i>1</i>	0,30 <i>7</i>	0,54 <i>8</i>	0,00 <i>1</i>	0,67 <i>6</i>	0,91 <i>2</i>
NO	0,00 <i>1</i>	0,29 <i>4</i>	0,50 <i>2</i>	0,00 <i>1</i>	0,64 <i>1</i>	0,91 <i>1</i>
PL	0,00 <i>1</i>	0,36 <i>15</i>	0,61 <i>16</i>	0,00 <i>1</i>	0,76 <i>16</i>	0,96 <i>14</i>
RU	0,00 <i>1</i>	0,33 <i>12</i>	0,59 <i>14</i>	0,00 <i>1</i>	0,75 <i>13</i>	0,95 <i>9</i>
SE	0,00 <i>1</i>	0,28 <i>2</i>	0,50 <i>2</i>	0,00 <i>1</i>	0,66 <i>4</i>	0,91 <i>5</i>
SI	0,00 <i>1</i>	0,32 <i>9</i>	0,57 <i>10</i>	0,00 <i>1</i>	0,75 <i>15</i>	0,96 <i>16</i>

Table 12. Social welfare of incomes and equivalent incomes in 2008 for various values of the bottom sensitivity parameter (ranks in italics)

Country	Income			Equivalent income		
	$\rho = 1$	$\rho = 2$	$\rho = 5$	$\rho = 1$	$\rho = 2$	$\rho = 5$
BE	27783 <i>8</i>	19309 <i>6</i>	12864 <i>6</i>	4179 <i>7</i>	1346 <i>7</i>	347 <i>6</i>
CH	30300 <i>5</i>	19059 <i>8</i>	12423 <i>8</i>	7139 <i>3</i>	2292 <i>3</i>	578 <i>4</i>
CZ	18287 <i>14</i>	13697 <i>14</i>	10040 <i>11</i>	1997 <i>14</i>	555 <i>14</i>	112 <i>13</i>
DE	28933 <i>7</i>	19125 <i>7</i>	12441 <i>7</i>	3069 <i>11</i>	878 <i>12</i>	196 <i>12</i>
DK	29171 <i>6</i>	21236 <i>4</i>	14906 <i>3</i>	7505 <i>2</i>	2709 <i>2</i>	653 <i>2</i>
EE	15699 <i>15</i>	10440 <i>15</i>	6735 <i>15</i>	1277 <i>16</i>	301 <i>16</i>	56 <i>16</i>
ES	23326 <i>11</i>	15069 <i>12</i>	9984 <i>12</i>	3185 <i>10</i>	898 <i>11</i>	201 <i>11</i>
FI	27696 <i>9</i>	19609 <i>5</i>	13266 <i>5</i>	4151 <i>8</i>	1270 <i>8</i>	307 <i>8</i>
FR	26593 <i>10</i>	17764 <i>10</i>	11754 <i>9</i>	4120 <i>9</i>	1228 <i>9</i>	280 <i>9</i>
GB	31142 <i>4</i>	18903 <i>9</i>	10869 <i>10</i>	5603 <i>5</i>	1653 <i>5</i>	319 <i>7</i>
GR	21938 <i>13</i>	14326 <i>13</i>	9587 <i>13</i>	3022 <i>12</i>	916 <i>10</i>	202 <i>10</i>
HU	13887 <i>18</i>	9860 <i>16</i>	6569 <i>16</i>	775 <i>17</i>	178 <i>18</i>	26 <i>18</i>
NL	31789 <i>2</i>	21648 <i>3</i>	14019 <i>4</i>	4532 <i>6</i>	1523 <i>6</i>	453 <i>5</i>
NO	43027 <i>1</i>	31582 <i>1</i>	22546 <i>1</i>	10870 <i>1</i>	3924 <i>1</i>	1022 <i>1</i>
PL	14262 <i>17</i>	9199 <i>18</i>	5691 <i>18</i>	1346 <i>15</i>	316 <i>15</i>	57 <i>15</i>
RU	14367 <i>16</i>	9540 <i>17</i>	6063 <i>17</i>	756 <i>18</i>	185 <i>17</i>	40 <i>17</i>
SE	31161 <i>3</i>	22592 <i>2</i>	15736 <i>2</i>	6431 <i>4</i>	2270 <i>4</i>	592 <i>3</i>
SI	22199 <i>12</i>	15073 <i>11</i>	9435 <i>14</i>	2474 <i>13</i>	579 <i>13</i>	101 <i>14</i>

Table 13. Social welfare of incomes and equivalent incomes in 2010 for various values of the bottom sensitivity parameter (ranks in italics)

Country	Income			Equivalent income		
	$\rho = 1$	$\rho = 2$	$\rho = 5$	$\rho = 1$	$\rho = 2$	$\rho = 5$
BE	27477 <i>8</i>	19097 <i>7</i>	13299 <i>6</i>	4285 <i>6</i>	1444 <i>6</i>	390 <i>5</i>
CH	34757 <i>2</i>	22940 <i>2</i>	14841 <i>3</i>	7776 <i>2</i>	2714 <i>2</i>	708 <i>2</i>
CZ	16729 <i>14</i>	12212 <i>14</i>	8983 <i>11</i>	1719 <i>14</i>	464 <i>14</i>	89 <i>14</i>
DE	28986 <i>6</i>	19450 <i>6</i>	12754 <i>7</i>	3272 <i>10</i>	874 <i>10</i>	180 <i>10</i>
DK	28162 <i>7</i>	20164 <i>5</i>	13828 <i>5</i>	6915 <i>4</i>	2482 <i>4</i>	595 <i>4</i>
EE	12999 <i>18</i>	8631 <i>18</i>	5590 <i>17</i>	1116 <i>16</i>	243 <i>16</i>	46 <i>16</i>
ES	22282 <i>11</i>	13904 <i>11</i>	8668 <i>13</i>	3245 <i>11</i>	847 <i>11</i>	156 <i>11</i>
FI	25828 <i>9</i>	18415 <i>9</i>	12423 <i>8</i>	3825 <i>8</i>	1213 <i>8</i>	268 <i>8</i>
FR	25779 <i>10</i>	17401 <i>10</i>	11059 <i>10</i>	3604 <i>9</i>	1081 <i>9</i>	252 <i>9</i>
GB	29794 <i>5</i>	19038 <i>8</i>	11262 <i>9</i>	5309 <i>5</i>	1529 <i>5</i>	281 <i>7</i>
GR	19388 <i>13</i>	12331 <i>13</i>	7716 <i>14</i>	2547 <i>12</i>	649 <i>12</i>	115 <i>12</i>
HU	13244 <i>16</i>	9337 <i>16</i>	6225 <i>15</i>	732 <i>18</i>	173 <i>18</i>	29 <i>18</i>
NL	30497 <i>3</i>	21256 <i>4</i>	14120 <i>4</i>	4153 <i>7</i>	1387 <i>7</i>	386 <i>6</i>
NO	41706 <i>1</i>	29736 <i>1</i>	20686 <i>1</i>	10128 <i>1</i>	3687 <i>1</i>	952 <i>1</i>
PL	15038 <i>15</i>	9700 <i>15</i>	5895 <i>16</i>	1404 <i>15</i>	341 <i>15</i>	63 <i>15</i>
RU	13020 <i>17</i>	8710 <i>17</i>	5286 <i>18</i>	827 <i>17</i>	211 <i>17</i>	45 <i>17</i>
SE	30379 <i>4</i>	21934 <i>3</i>	15068 <i>2</i>	7224 <i>3</i>	2485 <i>3</i>	621 <i>3</i>
SI	20205 <i>12</i>	13780 <i>12</i>	8769 <i>12</i>	2522 <i>13</i>	638 <i>13</i>	108 <i>13</i>

Table 14. Yearly growth rate in social welfare between 2008 and 2010 for incomes and equivalent incomes (ranks in italics)

Country	Income			Equivalent income		
	$\rho = 1$	$\rho = 2$	$\rho = 5$	$\rho = 1$	$\rho = 2$	$\rho = 5$
BE	-0,55% <i>4</i>	-0,55% <i>5</i>	1,69% <i>4</i>	1,27% <i>6</i>	3,66% <i>6</i>	6,21% <i>3</i>
CH	7,35% <i>1</i>	10,18% <i>1</i>	9,73% <i>1</i>	4,46% <i>3</i>	9,21% <i>1</i>	11,18% <i>1</i>
CZ	-4,26% <i>14</i>	-5,42% <i>16</i>	-5,26% <i>14</i>	-6,96% <i>17</i>	-8,20% <i>16</i>	-10,04% <i>16</i>
DE	0,09% <i>3</i>	0,85% <i>3</i>	1,26% <i>5</i>	3,31% <i>4</i>	-0,23% <i>7</i>	-4,19% <i>9</i>
DK	-1,73% <i>8</i>	-2,53% <i>9</i>	-3,62% <i>12</i>	-3,93% <i>13</i>	-4,19% <i>13</i>	-4,46% <i>10</i>
EE	-8,60% <i>18</i>	-8,67% <i>18</i>	-8,51% <i>17</i>	-6,31% <i>16</i>	-9,64% <i>17</i>	-9,29% <i>15</i>
ES	-2,24% <i>11</i>	-3,87% <i>13</i>	-6,59% <i>16</i>	0,94% <i>8</i>	-2,85% <i>10</i>	-11,19% <i>17</i>
FI	-3,37% <i>13</i>	-3,04% <i>12</i>	-3,18% <i>10</i>	-3,93% <i>12</i>	-2,27% <i>9</i>	-6,42% <i>13</i>
FR	-1,53% <i>6</i>	-1,02% <i>7</i>	-2,96% <i>9</i>	-6,26% <i>15</i>	-5,97% <i>15</i>	-4,98% <i>11</i>
GB	-2,16% <i>10</i>	0,36% <i>4</i>	1,81% <i>2</i>	-2,62% <i>9</i>	-3,75% <i>12</i>	-5,95% <i>12</i>
GR	-5,81% <i>17</i>	-6,96% <i>17</i>	-9,76% <i>18</i>	-7,86% <i>18</i>	-14,55% <i>18</i>	-21,72% <i>18</i>
HU	-2,32% <i>12</i>	-2,65% <i>10</i>	-2,62% <i>8</i>	-2,76% <i>10</i>	-1,53% <i>8</i>	5,57% <i>5</i>
NL	-2,03% <i>9</i>	-0,91% <i>6</i>	0,36% <i>6</i>	-4,18% <i>14</i>	-4,46% <i>14</i>	-7,39% <i>14</i>
NO	-1,54% <i>7</i>	-2,92% <i>11</i>	-4,13% <i>13</i>	-3,41% <i>11</i>	-3,03% <i>11</i>	-3,41% <i>8</i>
PL	2,72% <i>2</i>	2,72% <i>2</i>	1,80% <i>3</i>	2,15% <i>5</i>	3,93% <i>5</i>	5,88% <i>4</i>
RU	-4,69% <i>16</i>	-4,35% <i>15</i>	-6,41% <i>15</i>	4,72% <i>2</i>	6,95% <i>2</i>	6,78% <i>2</i>
SE	-1,25% <i>5</i>	-1,46% <i>8</i>	-2,12% <i>7</i>	6,16% <i>1</i>	4,73% <i>4</i>	2,50% <i>7</i>
SI	-4,5% <i>15</i>	-4,3% <i>14</i>	-3,5% <i>11</i>	1,0% <i>7</i>	5,1% <i>3</i>	3,5% <i>6</i>