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Abstract: The article is composed of two sections. The first one is a critical review of the three main alternative indices to GDP which were proposed in the last decades – the Human Development Index (HDI), the Genuine Progress Indicator (GPI), and the Happy Planet Index (HPI) – which is made on the basis of conceptual foundations, rather than looking at issues of statistical consistency or mathematical refinement as most of the literature does. The *pars construens* aims to propose an alternative measure, the composite wealth index, consistent with an approach to development based on the notion of composite wealth, which is in turn derived from an empirical common sense criterion. Arguably, this approach is suitable to be conveyed into an easily understandable and coherent indicator, and thus appropriate to track development in its various dimensions: simple in its formulation, the wealth approach can incorporate social and ecological goals without significant alterations in conceptual foundations, while reducing to a minimum arbitrary weighting.

Keywords: GDP, human development, sustainability, wealth, composite indicators

JEL Codes: B40, E01, I00, O10, Q5

1. INTRODUCTION

To this day, the literature about GDP and its limits has grown huge, with some resonance also with policy-making (Stiglitz, Sen and Fitoussi, 2009). Many alternative measures have been proposed and, although some of them – namely the Human development index (HDI), but also the Genuine progress indicator (GPI) and the Happy planet index (HPI) – have attained renown, at the present none has succeeded in replacing the long-standing primacy of GDP per capita. While it is widely acknowledged that GDP fails to properly track crucial dimensions of development, from environmental to social goals, there is acceptance that, at least, for GDP the choice of components series and their aggregation function are constrained by a consistent economic theory. This is not the case for alternative composite indicators, which not by chance have even been dubbed, by their critics, "mashup indices" (Ravallion, 2010a). If critics of both GDP and its alternatives have argued that the dashboard (of multiple indices) approach, which monitors each component separately, should be preferable (Ravallion, 2011), the advocates of composite indicators have developed a highly refined body of computational techniques, including pre-computation multivariate and post-computation sensitive analyses, in order to make multi-criteria evaluation

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flexible enough to adapt to different environments and policy goals.1 Although both these approaches may be useful to address specific problems,2 the big question still looms. Should we abandon the search for an indicator of economic performance which would be, at the same time, more inclusive than GDP, theoretically consistent, and comparable across periods and countries? Before answering affirmatively, we should rather understand why the most popular alternative composite indices thus far have failed to replace GDP. Secondly, we should investigate if the causes of this failure can be removed, i.e. if it would be possible to lay the foundation for an index not doomed to the same disappointing fate.

The starting point of this article is that the failure of the main alternative indices is due, in prime instance, to the weakness of their conceptual foundations. All of these indices are composite indicators which weight up different "dimensions" according to some criterion: as we are going to see, the aggregation function and/or the single dimensions are either faulty (Genuine progress indicator, Happy planet index), or incoherent with the declared goals of the index (Human development index). Up to the present, most of the criticisms have concentrated on the statistical consistency and composition of the indices, or on the accuracy and value of their single dimensions, whereas their conceptual foundations have been relatively overlooked.3 The result was that some of the new "improved" indices proposed, although mathematically increasingly more refined, were even less conceptually consistent, with paradoxical consequences in terms of policy indications (Ravallion, 2010b). On this, the case of HDI is emblematic, as I will briefly illustrate in paragraph §2; although less popular, GPI and HPI share the same flaws (§3).

The conceptual foundations of GDP are essentially the "wealth" or "income" approach, where wealth is intended in a very strict sense (material wealth, or even merely monetary wealth). The alternative indices are based either on the capabilities approach (the HDI), or on a sort of unclear (and highly subjective) combination of utilitarian and wealth theories (GPI, HPI). I argue that, among those proposed, the wealth approach is the best capable of being converted into an index, i.e. of measuring development, even when its multidimensionality is taken into account: wealth – or its periodical flow, income – is an "objective" quantity with can be measured with a reasonable degree of accuracy, unlike capabilities or utilities (§4); indeed, it is claimed that the wealth approach can also be extended in order to include social and ecological goals, for example after following an empirical criterion in defining the common sense (the sense of what is in common, as derived from experience)4 of what we want to measure, with a reasonable degree of objectivity. Thus far, alternative measures have failed because, instead of refining/extending the wealth approach, have searched for alternative approaches (capabilities, or a mix of utility and wealth) which, given their inherent lack of objective quantification, are inappropriate for measuring economic performance.

In short, this article maintains that some agreement upon a composite index of development, not arbitrary and at the same time more inclusive than GDP, can still be reached. The solution is to remain within the same conceptual framework as GDP. The ambitious goal of this writing is to lay the foundations for such an agreement. By way of example, in paragraphs §§ 4 and 5 I present

[1] A useful introduction can bee OECD/JCR, 2008. See also: Munda and Nardo, 2009, for mathematical modelling; Munda, 2004, for the importance of the social, political and technical structuring process in the computation scheme and the argument of context-dependant weights, which should be intended as importance coefficients and not as trade-off; Munda, 2005, for the development of a multi-criterion framework to measure sustainability.

2 For instance, see Munda and Naisana, 2011, for an application of a non-compensatory multi-criteria approach, combined with sensitive analysis, to the Spanish and other Mediterranean regions.

3 In OECD/JCR, 2008, out of 158 pages only one (p. 22) is dedicated to warn against possible inconsistencies in the theoretical framework. Less concise is the discussion in Ravallion, 2010a, pp. 7–10.

4 I derive this criterion, and what I call empirical common sense, from the empiricist tradition dating back to John Locke, 1690 [1964], in particular book IV (Of Knowledge and Opinion), and from Kant's description of sensus communis or common human understanding (Kant, 1790 [1987], pp. 159-162); the resulting definition of common sense is in line with those provided by the most popular English dictionaries (see forward, §4).

and briefly discuss various wealth indicators, including the "sustainable expected human wealth" (SEHW) index, a simple and arguably coherent measure which combines monetary, biological, intellectual, and ecological wealth.

2. FROM CAPABILITIES TO THE HUMAN DEVELOPMENT INDEX. SHORT REVIEW OF A FAILURE?

The Human Development Index (HDI) was introduced in 1990 by the United Nations Development Program (UNDP, 1990), in its first annual Human Development Report (HDR): through the years, HDI gained vast popularity, so much so that it is now the most established alternative to GDP. Its conceptual foundation must be found in the Sen's capabilities approach to welfare economics (Sen, 1985). Functional capabilities are substantive freedoms people have reason to value: for instance, the ability to live a long and healthy life, «longevity»; the ability to decide about one own future, assured by an adequate «education»; the ability to engage in economic transactions and to satisfy material needs, «resources». Accordingly, poverty must be understood as capability-deprivation. Thus illiteracy, ill health, lack of access to resources, must be considered as obstacles to what an individual can do in her/his life: human development consists in removing these obstacles (Sen and Anand, 1990).

Initially, Sen was sceptical about the idea and the possibility of synthesizing the complexity of the human capabilities approach into one single index. Nonetheless, Pakistani economist Mahbub ul Haq, in Sen's words "the originator of the Human Development Report", succeeded in persuading him that a single indicator was necessary as a means to policy makers alternative to GDP: it would shift the attention of policy makers, and hopefully of the larger public opinion, from maximizing income to maximizing welfare, i.e. from national income accounting to people-centred policies.5 In other words, HDI was devised for practical purpose: although it got some success as an alternative to GDP, as mentioned, it failed as an instrument for policy makers, as we are going to see. Through the years, further refinements drifted it further away from the original capability approach.

The three basic components of human life were recognized to be longevity, education, and resources. Consistently with the capability approach, these were computed in terms of deprivation, according to the formula:

$$(1)\quad I_{ij} = \frac{\left(\max_j X_{ij} - X_{ij}\right)}{\left(\max_j X_{ij} - \min_j X_{ij}\right)} \;;$$

where I_{ij} is the deprivation indicator for the jth country with respect to the ith variable. The three basic variables were Life expectancy (X_1) for longevity, adult literacy rate (X_2) for education, and the ln of real per capita GDP (X_3) for resources, whereas maximum and minimum values were

[5] In Sen's words: "Indeed, I must admit I did not initially see much merit in the HDI itself, which, as it happens, I was privileged to help devise. At first I had expressed to Mahbub ul Haq […] considerable scepticism about trying to focus on a crude index of this kind, attempting to catch in one simple number a complex reality about human development and deprivation". Sen also refers Mahbub's reply: "We need a measure […] of the same level of vulgarity as GNP – just one number – but a measure that is not as blind to social aspects of human life as GNP is" (UNDP, 1999, p. 23, also for the quotation about Mahbub ul Haq; see also Haq, 1995)

determined from the actual values of the current sample.[6] The average deprivation indicator was thus determined as the arithmetic mean of the three deprivation indicators:

$$(2)\ I_j = \frac{\sum_{i=1}^{3} I_{ij}}{3};$$

from which HDI was 1 minus the average deprivation index:

$$(3)\ \left(HDI\right)_j = \left(1 - I_j\right)$$

(UNDP, 1990, p. 109). This measure was straightforward, but appealing. The only serious arbitrariness was the use of a log transformation for resources: it was derived from the reasonable premise of diminishing returns from income to human development, and calculated following the well-known Atkinson formulation for the utility of income (Atkinson, 1979), in the presence of diminishing returns (UNDP, 1992, p. 91).

As early as with the second HDR, however, the formula for the education (knowledge) component had changed into an average of two-thirds literacy and one-third mean years of schooling (UNDP, 1991, pp. 88-89). Now, both the weights and the new indicator (mean years of schooling) looked somehow arbitrary. For what concerns mean years of schooling, it was unclear why every year of schooling was counted equal, in each country and also between countries (regardless of cross-country differences in school systems), and, above all, why for each year of schooling and each country the same relationship was supposed to be between years of schooling and the capability of deciding about one own future (i.e., why quantitative differences in the years of schooling, above the literacy threshold, should proxy the capability of deciding about one own future). Up to the present, these questions are still unanswered.

The next step was to move from empirical to theoretical thresholds, which from 1994 onwards were somehow arbitrarily decided for life expectancy (85.0 and 25.0 years), income (PPP $40,000 and $200), and mean years of schooling (15 and 0 years); only adult literacy was left unchanged, ranging from 0% to 100% (UNDP, 1994, p. 108). Then, by 1995, mean years of schooling (a stock measure just like adult literacy ratio) were substituted by combined primary, secondary and tertiary enrolment ratios (a flow measure), ranging from 0% to 100% (UNDP, 1995, p. 134). This was one more step away from the capability approach, which further increased the arbitrariness of the education component, not least because enrolment ratios are flow measures referring to only a part of the population (unlike literacy and mean years of schooling, which are stock measures referring to the whole population). What is worse, in the 1995 HDR there is no justification at all for this change.

Together with great interest,[7] since its introduction HDI also received widespread criticisms, from McGillivray (1991) onwards. Broadly speaking, these criticisms can be catalogued into three

6 In 1990: 78.4 and 41.8 for life expectancy; 100.0 and 12.3 for adult literacy rate; 3.68 and 2.34 for real GDP per capita (log).

categories, not necessarily mutually exclusive: a) those who rejected some or all of the components of the HDI (and the related conceptual framework) and, in some cases, proposed new and alternative indices, such as the Genuine Progress Indicator (Cobb and Cobb Jr., 1994) and similar; b) those who accepted the basic components of the HDI and its conceptual foundations, but added new dimensions, such as political freedom, inequality, pollution; c) those who concentrated on the way the three components were measured and computed. In just a handful of years, the bibliography grew considerably, so much so that we must limit ourselves to the most relevant contributions. While point a) will be developed in the next paragraph, we now focus on the criticisms falling under points b) and c).

For what concerns point b), further developments have considerably extended the number of basic capabilities, with the decisive contribution by Amartya Sen and Sudhir Anand – on sustainability and environment (Sen and Anand 1994a, 1994b), gender equality (Sen and Anand, 1995), human poverty (Sen and Anand, 1997), human rights (Sen and Anand, 2000) – as well as by Martha Nussbaum (2000), who has raised the number of basic capabilities up to ten dimensions.[8] As a consequence, over the years the HDRs have been enriching by incorporating new indicators, such as those on gender equality or human poverty (for a synthesis, see Fukuda-Parr, 2003, p. 303). However, these indicators were computed and discussed as qualifications to the HDI, whose basic composition was not changed, at least in the HDRs. As a consequence, a sort of hierarchies among human capabilities was created which, once again, had no theoretical foundations: why were some capabilities (longevity, knowledge, resources) computed in a synthetic index, with trade-off implications to the policy maker, while others were treated separately? Up to the present, also this question remains unanswered in the HDRs. On the other hand, many authors have proposed new indices incorporating new or different capabilities: the literature grew as a forest around a tree, and yet still without incorporating the total range of capabilities as developed by Nussbaum, and often with remarkably fragile theoretical and mathematical foundations. The factory of (redundant) composite indicators has been running into high gear, with alleged but indeed more and more feeble links with the capability approach.

Concerning point c), different “improved” HDI have been proposed, aiming to overcome some shortcomings of the previous formulas. Following Kakwani (1993), Leandro Prados (2010) has recently presented an «improved» HDI, along with historical estimates for the world and its main regions covering the period spanning the late XIX century until our days. The main novelties are the use of a convex achievement function for the social components (longevity and education), which assigns higher values (higher achievement) to improvement at the higher levels, and the use of a geometric average, rather than an arithmetic one, in order to reduce substitutability among the index components (i.e., the index performs better when all the three components perform better, and a decrease in one component is hardly compensated by an increase in another).[9] However, not all agreed with these changes, quite the contrary. For example, some authors (Tsui, 1996) have challenged the assumption of a convex achievement function (and thus of increasing returns)

7 For example, among economic historians: see Crafts (1997, 2002) for cross-country comparisons, and Felice (2007a) for the Italian regions.

8 These are: 1) life, 2) bodily health, 3) bodily integrity, 4) sense, imagination, and thought, 5) emotion, 6) practical reason, 7) affiliation, 8) other species, 9) play, 10) control over one’s environment (Nussbaum, 2000).

9 In Prados’ words: “The final outcome is a new human development index which, by not concealing the gap between rich and poor countries, casts a much less optimistic view than the one provided by conventional UNDP index while satisfying the HDR concern for international differences” (Prados, 2010, p. 842). The author also introduced some minor changes in the maximum and minimum thresholds, because in his wide historical and geographical range of observations the UNDP maximum and minimum represented cases above the highest and below the lowest, respectively: Thus, for life expectancy the minimum was lowered to 24 years. Following Prados, Felice (2007b) has estimated an improved HDI of the Italian regions, in benchmark years from 1891 to 2001.

for the social components; others (Noorbakhsh, 1998) have even proposed to extend to education the assumption of diminishing returns.

Although at the present the literature is inconclusive, in their latest human development report (UNDP, 2010) the United Nations have accepted some of the above criticisms and made a considerable effort to improve their measure. The three HDI components are now measured as follows:

$$(4)\ new\left(1-I_{ij}\right)=\frac{\left(X_{ij}-\min_{j} X_{ij}\right)}{\left(\max_{j} X_{ij}-\min_{j} X_{ij}\right)}.$$

For longevity (X_1), which is still measured through the Life expectancy index (LeI), the minimum threshold is theoretical (20 years), while the maximum (83.2) is empirical (the maximum value observed in the sample, Japan in 2010). Education (X_2) is measured through an Education index (EI), which is an equal-weighted geometric average of the Mean years of schooling index (MYSI), measured as the mean years of schooling divided by 13.2 (the maximum value observed in the sample, United States in 2000; the minimum equals zero), and the Expected years of schooling index (EYSI), measured as the expected years of schooling divided by 20.6 (the maximum value observed in the sample, Australia in 2002; the minimum equals zero); EI is then proportioned on a maximum of 0.951, the maximum value of the combined Education index observed in the sample (new Zealand in 2010), and a minimum of 0. For resources (X_3), measured through the Income index (II), (ln of) Gross national income, expressed in 2008 US$ PPP, is used instead of (ln of) Gross Domestic Product, (ln of) 108,211 and (ln of) 163 being respectively the maximum (United Arab Emirates in 1980) and minimum (Zimbabwe in 2008) values observed in the sample.[10] The three components are then weighted through a geometric mean, according to the formula:

$$(5)\ \left(new\ HDI\right)_j=\sqrt[3]{\prod_{i=1}^{3} new\left(1-I_{ij}\right)}.$$[11]

To sum up, the three main innovations are: a) the use of a geometric mean to weight the three components, which reduces substitutability among them and was common also to the improved HDI; b) the return to empirical (rather than theoretical) thresholds; c) a remarkable refinement of the Education indicator, together with some refinement of the Income indicator.[12]

10 GNI looks indeed more appropriate, since it captures the income from national citizens living abroad, namely the remittances from emigrants, while excluding the income produced within the country which goes to foreign citizens.
11 In the 2010 UNDR, the new HDI is estimated for benchmark years from 1980 up to 2010. The report also presents an inequality adjusted Human development index (IHDI), which is in turn a geometric mean of geometric means – each one computed by discounting each dimension's average value according to its level of inequality, based on a distribution-sensitive class of composite indices.
12 Out of the possible innovations, the proposal of using a convex function rather than the linear transformation for the non-income components was not received, since it was considered inconsistent with the capability approach: for example, at a late age a further increase in life expectancy should not result into a more than proportionally greater capability of living a long and healthy life. Indeed, in the case of income, following Anand and Sen (2000), it was reasserted that the concave form of the transformation function was more in line with the capability approach.

At a first glance, the new index represents a considerable advance upon the old one. At a first glance. A more in-depth analyses reveals remarkable inconsistencies with both the capability approach and the proposed goals of economic policy. First, for what concerns the education indicator, the last refinement is indeed a further step away from a measure consistent with the capability approach: literacy was, after all, the only indicator easily understandable in terms of capabilities, and it is now abandoned. But the major inconsistency is probably another one. As efficaciously pointed out by Ravallion, after the introduction of the geometric mean, tradeoffs between the single components have become troubling, at least. In Ravallion's words:

The new HDI has also greatly reduced its implicit weight on longevity in poor countries, relative to rich ones. A poor country experiencing falling life expectancy due to (say) a collapse in its health-care system could still see its HDI improve with even a small rate of economic growth. By contrast, the new HDI's valuations of the gains from extra schooling seem unreasonably high – many times greater than the economic returns to schooling (Ravallion, 2010b, p. 2).

Ravallion holds that these troubling tradeoffs could be largely avoided by using some alternative specifications of Chakravarty's "generalized old HDI" formula, together with replacing Ln GNI with GNI in the Income index and with using the arithmetic mean for the two schooling variables. In more detail, given the formula from Chakravarty (2003):

(6) $HDI^c = [f(LeI) + f(EI) + f(II)] / 3$

Ravallion proposes two special cases of $f(I_x) = I_x^r$, for (0 < r < 1) (the old HDI is the limiting case when r = 1, with perfect substitutability), when r = 0.5 and 0.25. These coefficients maintain some imperfect substitutability and have inter-component tradeoffs more in line with the declared goal of the index. It goes without saying, however, that these coefficients too are somehow arbitrary and so are the tradeoffs. Furthermore, Ravallion himself does not provide any guide to sort between the virtually unlimited possible values of r, although he shows some preference for a 0.5 value.

As mentioned, the HDI had been introduced to give policy makers "one simple number" through which to devise and assess more people-centred policies. After more than two decades of debates and refinements, the result was either a number which would favour less people-centered policies (the new Hdi) or an unlimited amount of alternatives, i.e. too many numbers which, of course, mean no number at all.

3. MIXED FOUNDATIONS: THE GENUINE PROGRESS INDICATOR AND THE HAPPY PLANET INDEX

Measures of economic performance alternative to both GDP and HDI can be subject to criticisms similar to those raised against HDI, after allowing for the different theoretical approaches. Being impossible to review all of the indices recently proposed, whose number is growing almost day by day, we are going to concentrate on the most popular two, the Genuine progress indicator (GPI) − a "green" GDP − and the Happy planet index (HPI). These are the only two which gained some success at the institutional level, as testified by the adoption by Chinese and Indian

government of the “green” GDP accounting system (e.g. Financial Express Bureau, 2009), or by the support expressed by the UK conservative leader Cameron in favour of HPI (Parker, 2007).

Unlike GDP, GPI is a measure of economic growth which aims to distinguish between good and bad growth. Its foundations date back to a seminal work of Daly and Coby (1989) and are similar to those of the Index of Sustainable Economic Welfare (ISEW) and of other “green” GDP accounting systems. “While methodologies are somewhat different – as synthesized in the GPI 2006 report – the ISEW, GPI, and other green GDP accounting systems all involve three basic steps”. The starting point are estimates of personal consumption expenditures, “which are weighted by an index of the inequality in the distribution of income to reflect the social costs of inequality and diminishing returns to income received by the wealthy”. The second step consists of a number of additions, “made to account for the non-market benefits associated with volunteer time, housework, parenting, and other socially productive time uses as well as services from both household capital and public infrastructure.” The third step consists of deductions, “to account for purely defensive expenditures such as pollution related costs or the costs of automobile accidents as well as costs that reflect the undesirable side effects of economic progress”. Other kind of deductions, “for costs associated with degradation and depletion of natural capital incurred by existing and future generations are also made at this stage (Talberth, Cobb, and Slattery, 2007, p. 3; see also Stockhammer *et al.*, 1997; Neumayer, 2000). In more detail, the GPI is derived from 25 indicators, according to the formula:

(7) GPI = PC / (GI × 100) + VHP + VHE + VVW + SCD + SH − CCr − LLT − CUn – CCD – CCom – CHPA – CAA – CWP – CAP – CNP – LWL – LFL – LPF – RD – CDED – COD +/− NCI +/− NFB;

where PC is personal consumption; GI, Gini Index; VHP, value of housework and parenting; VHE, value of higher education; VVW, value of volunteer work; SCD, services of consumer durables; SH, services of highways; CCr, cost of crime; LLT, loss of leisure time; CUn, cost of underemployment; Ccom, cost of commuting; CHPA, cost of household pollution abatement; CAA, cost of auto accidents; CWP, cost of water pollution; CAP, cost of air pollution; CNP, cost of noise pollution; LWL, loss of wetlands; LFL, loss of farmland; LPF, loss of primary forests; RD, resource depletion; CDED, carbon dioxide emission damage; COD, cost of ozone depletion; NCI, net capital investment; NFB, net foreign borrowing (Talberth, Cobb, and Slattery, 2007, pp. 8-18).

Although not devoid of foundations in both economic theory and the principles of sustainable development, unsurprisingly such a measure too has raised severe criticisms, concerning either its theoretical foundations, calculation methods, and the choice of components (for an overview, see ibidem, p. 7). Over the years, successive refinements have coped with some computational problems, but the result is still far from answering to what is probably the main objection, concerning the arbitrariness of what GPI includes or excludes. This arbitrariness is due to the lack of consistent conceptual foundations. Apparently, the index is trying to measure “sustainable utility”. But this ambition reveals two fundamentals contradictions.

First, being highly subjective “utility” cannot be measured by any objective index. For example, personal consumption is discounted by income inequality on the reasonable assumption that rising income inequality hinders economic welfare (Hsing, 2005), but why the Gini index is used instead

of other measures is unclear,[13] neither the assumption of a linear function between growth in inequality (whatever the corresponding index may be) and reduction in welfare is discussed and justified. Moreover, as emphasized by Neumayer (1999), GPI does not allow for corrections for other dimensions having an effect on utility, such as degree of political freedom or degree of inequality between sexes. Still, disservice items (such as commuting costs, the loss of leisure, etc.) are highly subjective and cannot be computed on the basis of objective measures: for example, the loss of leisure is measured in terms of the average real wage rate, but this can hardly be the same for every citizen: rather, every citizen should have computed her/his own leisure time in terms of his/her own wage rate; furthermore, as stressed among the others by Rymes (1992) and Lawn (2005), it is unclear whether or not these disservice costs have been already included into household and worker decisions. Indeed, the only way of measuring utility consistent with the utility approach should be to subjectively quantify the utility of each person, for example by asking people how much they are happy. This is what the Happy Planet Index tries to do, but this method does not escape the overall criticism to the utility approach, as formulated most notoriously by Amartya Sen (1999; see forward).

The second contradiction comes with the adjective "sustainable". As pointed out efficaciously by Dietz and Neumayer (2006, p. 189), it is "not possible to combine an indicator of current welfare with an indicator of sustainability": the depletion of non-renewable resources, in fact, can hardly have an impact on *current* welfare, i.e. on utility. However, deductions for natural capital depletion have some foundations in the economic theory, as pointed out by defenders of GPI such as Lawn (2003), in fact they are consistent with the traditional Fisher's definition of capital and income (Fisher, 1906). The point here is that the concepts of capital and income should be properly linked to the wealth approach, rather than to the utility one, as we are going to see in the next section. But this is another matter. For now, let's just turn our attention to the Happy Planet Index.

The Happly Planet Index (HPI) is a measure of the ecological efficiency of supporting well-being. Its formula looks more straightforward than GPI's and, by some regards, more appealing. The only three components are life expectancy, life satisfaction, and the ecological footprint. Via multiplying life expectancy by life satisfaction, a composite indicator called Happy Life Years (HLY) is estimated, which is then divided by the Ecological Footprint (EF) to calculate the index; the addition of two constant (α and β) is also necessary, in order to standardize variations and then tradeoffs among the components:[14]

(8) $HPI = [\, HLY / (EF + \alpha) \,] \times \beta$.

Data on life satisfaction are obtained by asking to a sample of people a simple question: *All things considered, how satisfied are you with your life as a whole these days?*, with responses ranging from 0 (unsatisfied) to 10 (satisfied) (Abdallah *et al.*, 2009, p. 52). The ecological footprint of an individual (per capita), expressed in units of "global hectares", is a measure of the amount of land required to provide for all her/his resource requirements, plus the amount of vegetated land required to absorb all her/his CO_2 emissions and the CO_2 emissions embodied in the products she/he consumes.[15] Estimates of global hectares allow to estimate the total amount of productive hectares available on the entire planet: by dividing this amount by the world's population, it is then

13 As known, the Gini index has some mathematical limitations: it tends to increase with the size of the population (and thus of the country) and does not perfectly replicate income distribution (because of differing shapes of the Lorenz curves, two countries scoring the same Gini index and the same income average may have a very different income distribution).
14 Their value changes according to the values in the sample: in the 2005 report, α was 3.35 and β 6.42; see the report (Abdallah et al., 2009), pp. 54 and 60, for more details.
15 Ecological footprint data for 2005 were available from WWF (2008).

possible to calculate a global per capita figure, «on the basis that everyone is entitled to the same amount of the planet's natural resources» (id., p. 12).

Although this methodology is still a matter of some discussion, the ecological footprint is an objective measure (at least, one aiming to be so), with no arbitrariness. This is true also for life expectancy, of course, but the same can't be said for life satisfaction. Thus the HPI is an indicator combining objective and subjective measures of well-being. In conceptual terms, it looks like a mixture of the utilitarian and the wealth approach. Life satisfaction is an utilitarian measure, whereas life expectancy and the ecological footprint are measures of wealth (respectively, the number of years an individual has, and a measure of the ecological efficiency in order to produce a certain amount of wealth).

The problem is that the utilitarian and the wealth approach cannot be reconcilable. More in detail, utilitarian measures, being subjective, should not be used as indices of economic performance together with wealth indices. Amartya Sen (1999, pp. 54–110) has made a good point against the use of utilitarian measures as objective indicators, and his lesson should not be overlooked. The two main problems are distributional indifference (happiness can be less costly for some people, but it would be unfair to give these people lesser opportunities) and – even a worse one, when it comes to cross-country comparisons – adaptation and mental conditioning: people can adapt to oppressive situations, and thus the utilitarian approach can be unfair towards people living in oppressive countries, ending up by justifying those oppressions (in the largest sense, including also the oppressions deriving from a lack of material resources). This in part what happens with HPI: in the top ten ranking we find countries such as Guatemala and Honduras (Abdallah *et al.*, 2009, p. 61), where life is hard by any objective standard. Such amazing results look, indeed, unacceptable by any reasonable standard.

4. WHAT WE CAN MEASURE: THE COMPOSITE WEALTH APPROACH

The enduring success of GDP is due, not least, to its coherent conceptual foundations, which can be referable to the wealth approach. In a nutshell, GDP is a monetary measure of the amount of resources (goods and services) saleable in the market that an economy can produce (Beckerman, 1987; Feinstein, 1987; Lequiller and Blades, 2006). It is therefore a measure of income, i.e. of the wealth produced in a certain time period (one year, one month, etc.). Wealth, or resources, are something we can measure with a reasonable degree of objectivity. Alternative indices – HDI, GPI, HPI –have failed thus far to supplant GDP because their corresponding "functions" (such as capabilities, utilities, or a mixture of utilities and wealth: what they measured) could not be quantified with the same (reasonable) lack of arbitrariness.

Wealth has not only the advantage of being more easy to define and thus to measure. It can also be extended to incorporate dimensions uncovered by GDP, in a way relatively easy to comprehend and to be conveyed through an index. Wealth can be decomposed in different "modules", or dimensions, each one capable of standing alone with its own measurement and, at the same time, of being combined with other modules, as different layers are. In fact, it is much easier to combine dimensions in the case of wealth, than it is with capabilities or utilities; as a consequence, the resulting indices look more understandable and internally consistent than those derived from the capability or the utility approach. By standards of empirical common sense,[16]

16 Common sense is here used with a meaning in line with the definition provided by the most popular dictionaries, namely Cambridge Dictionaries Online ("the basic level of practical knowledge and judgment that we all need to help us live in a reasonable and safe way":

some agreement can be reached upon the following basic dimensions of wealth: physical (material and biological) wealth on the one side, intellectual (knowledge and freedom wealth) on the other one, which in turn can be combined to form human wealth; all of these dimensions can then be rescaled to allow for the sustainability of the planet.

As a first step, we should define *material* wealth as the amount of saleable goods and services one person produces. This can be measured through the standard GDP or GNI indices, with some refinement in order to allow for more dimensions which, although not included in GDP or GNI, when expressed in monetary terms are in line with the concept of "real" material wealth.[17] These dimensions can be depletion and degradation of natural resources, consumption of fixed capital, and the negative consequences of pollution. The resulting formula for yearly material wealth (yMW) is the following:

(9) yMW = GNI – CFC – MD – ED – NFD – CDD – WPD – PED;

where GNI is Gross National Income, i.e. the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad; CFC is consumption of fixed capital (the replacement value of capital used up in the process of production); MD is an estimate of mineral depletion; ED is an estimate of energy depletion; NFD is an estimate of net forest depletion; CDD is an estimate of carbon oxide damage (basic air pollution); WPD is an estimate of water pollution damage (water pollution); PED is an estimate of particular emission damage (other pollution). Of course, all data should be per capita and, when it comes to international comparisons, expressed at purchasing power parities (for example through international PPP dollars, as usual).

Life expectancy at birth is no doubt the most comprehensive and objective indicator of *biological* wealth (BW, the amount of life one person has). By multiplying biological wealth through material wealth, we have *expected material* wealth (EMW), or *physical* (material × biological) wealth; i.e. the expected income at birth, a linear combination of life expectancy and income:

(10) EMW = PW = BW × yMW =

= (GNI – CFC – MD – ED – NFD – CDD – WPD – PED) × Le

It should be noticed that the new index incorporates two of the three elements of the capability approach, but avoiding the thorny problem of tradeoffs, given the lack of imposed weights. It is what it is, nothing more. Some alternative methods to correct GDP per capita with life expectancy have been put forward in the last decades, usually following the utilitarian approach. For instance, Usher (1973, 1980) has proposed to assign to life expectancy a weight inversely proportional to a parameter, β, which is assumed to be the elasticity of annual utility with respect to consumption;

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http://dictionary.cambridge.org/dictionary/british/common-sense) (Cambridge Dictionaries, 2011) or Merriam-Webster's Online Dictionary ("Sound and prudent judgement based on a simple perception of the situation of facts": http://www.merriam-webster.com/dictionary/common+sense) (Merriam Webster, 2011). Such definitions of common sense are based on human experience and/or practical knowledge and thus, rather than to the common sense realism school of Reid, which was based on innate beliefs and developed into conservative epistemological particularism, they can be referable to the empiricist tradition, from Locke (1690 [1964]) onwards: in a nutshell, common sense would rise as the sense of things in common from different – empirical – impressions. They are also in line with Kant's description of sensus communis, i.e. (better, in Kant's view) of common human understanding: "man's sound ([but] not yet cultivated) understanding, (…) the very least that we are entitled to expect from anyone who lays claim to the name of human being" (Kant, 1790 [1987], p. 160).

17 Recent research emphasizes as environmental accounting is not necessarily at odds with GDP and GNI accounts; as a consequence, the contributions of nature to human welfare can be defined and measured in a way consistent with the wealth approach: e.g. Boyd and Banzhaf, 2007.

however, there is no consensus about the value of β, which could range from 0.25 to 0.45 (Usher, 1973; Williamson, 1984; Costa and Steckel, 1997), and of course these changes in the parameter β can have a significant impact on the final index.[18] More recently, Jones and Klenow (2010) have proposed a money metric of social welfare based on expected utilities, which adjusts consumption per person, at purchasing-power parity, to allow for differences in longevity, leisure and inequality; this method too requires the specification ex-ante of an utility function, being consistent with the utilitarian approach and thus subject to the same criticisms: inevitable arbitrariness in trying to assign objective values (and weights) to subjective preferences. Conversely, the wealth approach does not face this sort of problems: the resulting index is much cruder, but does not require any ex-ante weighting scheme; above all, we know what it means, i.e., the total material wealth one individual can produce during her/his life.

Other dimensions of wealth are not material and, arguably, less unbiased. *Intellectual* wealth can be regarded as composed of *knowledge* wealth (KW, the amount of knowledge one person has) and *freedom* wealth (FW, the theoretical amount of freedom one person has). By way of example, knowledge wealth can be measured through per capita years of schooling (MYS, mean years of schooling), freedom wealth through more questionable measures of theoretical freedom such as the Freedom rating (FR) reported annually by the authoritative Freedomhouse (e.g., 2006). Both these indicators are improvable and can be subject to some criticisms. Per capita years of schooling do not capture neither informal knowledge which is developed throughout one's life, neither cross-country differences in formal education.[19] Although Freedomhouse strives to provide unbiased cross-country measures of freedom, to my view with remarkable success, its Freedom rating is not, and could not be, based on any objective measure of freedom; indeed, it is a subjective estimate provided by a panel of experts, who combine different dimensions of political and civil freedom – upon the standards of liberal democracies – with equal weights.[20]

A more precise measure of knowledge and an undisputable measure of freedom would be both highly desirable, but to produce these measures is a daunting task which would go well beyond the scope of this article, whose aim is just to discuss how they could be used. In more detail, I argue that KW and FE should be considered jointly, mainly because – as rightly emphasized by the advocates of the capability approach – a better education serves to enlarge our chances of deciding about our own future and of choosing the life we want to live, and thus its benefits can be strongly limited by the lack of political and civil freedom. This involves that KW and FW should be weighted through a geometric average, to reduce their substitutability. In order to do so, FW should be normalized in order to have the same average and standard deviation as KW, that is, it should be expressed in per capita years of schooling[21] (or viceversa, per capita years of schooling should be expressed in freedom rates). The resulting indicator of Intellectual Wealth, IW would be:

18 For a recent application to the Italian case, see Brandolini and Vecchi (2011).

19 Pisa (Program for International Student Assessment) data measuring school attainment are available in benchmark years since 2000, but don't cover all the world countries; moreover, they are limited to school-age pupils, while we are interested to measure the knowledge of the whole population (e.g. OECD 2007).

20 The index is in turn a simple average of scores in political rights (PR) and civil liberties (CL); these categories are in turn composed of three subcategories for political rights (electoral process, political pluralism and participation, functioning of government), of four subcategories for civil rights (freedom of expression and belief, associational and organizational rights, rule of law, personal autonomy and individual rights), all drawn from the Universal Declaration of Human Rights: for each subcategory, an index is estimated going from 1 (highest, totally free) to 7 (lowest, totally not free) (Freedomhouse, 2006). In order to be computable, freedom ratings are rescaled, by: 8 – FR

21 This can be achieved through a simple two-steps procedure. First, any FW observation is re-scaled to a new observation, which is the sum of the arithmetic FW mean plus the product of the difference between the observed value and the arithmetic FW mean on the one side, and the ratio between the coefficients of variation (CV: ratio standard deviation / mean) of FW and KW distributions on the other; this steps ensures that the new FW distribution has the same coefficient of variation as the KW distribution. Secondly, each value of the new FW distribution is multiplied by ratio between the mean of the KW distribution and the mean of the new FW distribution; this

(11) $IW = (KW \times FW_{in\ KW})^{1/2} = (MYS \times FR_{in\ MYS})^{1/2}$.

Although it can be reasonably argued that they refer to essentially different dimensions and thus should be kept separate, together intellectual and material wealth form what can be generally regarded (again, from empirical common sense) as *human* wealth (HW). There are various ways to combine intellectual and material wealth. One could be, for example, expressing intellectual wealth in the same unit of measure as material wealth (i.e., international PPP dollars; or viceversa, to express material wealth in years) and thus weighting the two indices by way of geometric or arithmetic average. And yet this procedure would involve important arbitrary choices, thus calling back the same unresolved questions of the capability approach (arithmetic or geometric mean? and above all, which weights to assign to dimensions which are inherently so different?): questions difficult, if not impossible, to settle on any firm ground. An alternative method, which in my view involves much less arbitrariness, would be that of augmenting BW (life expectancy at birth) by the index of intellectual wealth, thus assigning different values to the years a person lives, according to the intellectual wealth (i.e: the possibility of deciding about one own future) that a person has. First, for each observation, we can convert IW into a value > or < 1, whether it is above or below the world population-weighted average (i.e., we divide the observed value by the world average). Secondly, the new IW distribution is re-scaled so that it scores the same coefficient of variation as BW. Thirdly, for each observation the new IW figure is multiplied by the corresponding BW, thus producing an indicator of the *intellectual-biological* wealth:

(12) $IBW = BW \times IBW = BW \times (IW_i/IW_m)_{in\ BW\ cv}$

In order to have the expected human wealth (EHW) index, IBW is thus substituted to BW in (10):

(13) $EHW = IBW \times yMW$;

from (13), it also follows that the yearly human wealth (yHW) index is simply EHW without life expectancy:

(14) $yHW = (IW_i/IW_m)_{in\ BW\ cv} \times yMW$.

It may be worth noticing that (13) incorporates all the basic dimensions of the capability approach (resources, longevity, knowledge, human rights) into a wealth approach which, among the others, has reduced to a minimum the problem of arbitrary weighting and thus of trade-offs between the components.

A further and final step can be made by incorporating in this approach the concept of sustainability. In order to do this, we can avail of two more measures, both expressed in global hectares per capita: Biocapacity (BC), “the area of land or sea available to serve a particular use”, which “represents the biosphere’s ability to meet human demand for material consumption and waste disposal”; and the Ecological footprint (EF), a measure of “human appropriation of ecosystem products and services in terms of the amount of bioproductive land and sea area needed to supply these products and services” (Ewing *et al.*, 2010, p. 3). BC calculation covers five land use types – cropland, grazing land, fishing ground, forest land, and built-up land – whereas EF calculation covers six land use types, i.e. the same types as biocapacity, plus the uptake land to accommodate the carbon footprint. If a country scores a national EF higher than the world

yields a new FW distribution with the same mean as the KW distribution, while maintaining the same CV (which was set equal to that of the KW distribution): as a consequence, we have a new FW distribution scoring the same mean, SD, and CV as the KW distribution.

average biocapacity (wBC), this means that each human being living in that country is consuming more resources than those the earth can provide on average to each human-being of the world. For each country, a world sustainability (wS) index is thus the ratio wBC/EF (> 1 = sustainability; < 1, unsustainability).[22] A *sustainable* expected human wealth (SEHW) index is thus the product of wS and EHW:

(15) SEHW = EHW × wS;

This formula has, after all, some in common with the one used for the Happy Planet Index (8): both are based over the ratio wBC/FC, although the re-scaling methodology is different. In our case, however, instead of the Happy Life Years (an indicator mixing subjective and objective measures, utility and wealth approach) we have wealth indices based on objective measures and on a simple but coherent theoretical foundation.

It goes without saying that the coefficient of sustainability (wS) can be also extended to the other measures of wealth, thus obtaining indices of sustainable human wealth (SHW), sustainable expected material wealth (SEMW), sustainable material wealth (SMW): as mentioned, the wealth approach has the advantage of being easily decomposable in modules, which, in turn, can be recomposed to produce new composite indicators, with a relatively reduced loss in terms of consistency and immediacy.

5. ESTIMATES AND COMPARISONS

The Appendix shows estimates of the wealth indicators for most of the world countries in 2005, together with a brief description of sources and methods. This section is devoted to discussing those results, mostly by comparing them with the well established measures previously discussed, such as GNI, HDI, and HPI. As can be seen from Table 1, the correlation between yearly material wealth (yMW) and GNI, in both continuous values (Pearson correlation) and ranks (Spearman correlation), is very high, usually higher than the correlation between GNI and any other indicator. On the whole, all the wealth indicators which incorporate material wealth remain highly correlated with GNI, more than HDI or HPI are. It is worth noticing that there is no correlation at all between GNI and HPI, as well as that the correlation between HDI and GNI increases, rather than decreasing, when passing from the old to the new formula.

While GNI is *positively* correlated with all the indicators except HPI, world Sustainability (wS) is *negatively* correlated with all of them, including life expectancy, freedom, knowledge, and HDI; the only exception is HPI, whose positive coefficient is insignificant nonetheless. In the Happy Planet Index, the inclusion of wS annuls the correlation between the index (and in particular its HLY component) and GNI, at least in continuous values. Instead, in the wealth indices the inclusion of wS reduces the correlation with GNI without eliminating it.

HPY is neither (Pearson-)correlated with yearly material wealth, nor with most of the (pre-sustainability) other wealth indicators, with the exception of biological wealth and, partly, of knowledge wealth. After revising the wealth indicators to allow for sustainability, however, these

22 It is important to compare countries' EF with world's BC, otherwise we would have an index of national sustainability (nS) strongly dependent on population density, which would make sense only if each country was concerned with its own sustainability (i.e., if ecological issues would not be a global problem): for example, Canada would have a nSI higher than 1 (2,1), although its ecological footprint is almost three times the world biocapacity; Canada's nSI tells us that, if the country could keep on consuming its resources without caring for the rest of the world, it still had room to double its EF.

become correlated with HPI, both in continuous values and ranks. At the same time, as mentioned the sustainable wealth indices maintain their correlation with GNI. In all of these cases, rank-Spearman correlation is higher than Pearson one, which means that, when passing from one indicator to another, countries' ranks change less than countries' absolute values. HDI, both new and old, is also correlated with both GNI and HPI; and yet in this case Spearman correlation is lower than Pearson's, i.e. differences are more pronounced in ranks than in absolute values: this finding casts some doubts on the reliability of HDI measures for cross-country comparisons, in line with some of the criticisms we have seen in paragraph §2. In ranks, HPI is more correlated with the sustainable wealth indicators than it is with old and new HDI; these latter, however, are more correlated with GNI. It goes without saying that HDI and wealth indicators are also strongly correlated.

Table 1. *Pearson (upper-right) and Spearman (lower-left) correlations between pairs of indices, 2005*

	GNI	yMW	BW	EMW	KW	FW	IW	yHW	EHW	wS	SyMW	SEMW	SyHW	SEHW	oHDI	nHDI	Lif-Sat	HLY	HPI
GNI	1	0.986**	0.672**	0.984**	0.635**	0.574**	0.685**	0.974**	0.972**	-0.650**	0.817**	0.843**	0.848**	0.866**	0.773**	0.796**	0.684**	0.739**	0.033
yMW	0.976**	1	0.680**	0.999**	0.653**	0.620**	0.722**	0.995**	0.993**	-0.651**	0.843**	0.869**	0.880**	0.899**	0.779**	0.800**	0.684**	0.745**	0.037
BW	0.868**	0.872**	1	0.685**	0.722**	0.483**	0.682**	0.668**	0.671**	-0.639**	0.722**	0.763**	0.726**	0.754**	0.935**	0.917**	0.834**	0.919**	0.582*
EMW	0.975**	0.997**	0.899**	1	0.645**	0.615**	0.714**	0.995**	0.995**	-0,638**	0.838**	0.868**	0.876**	0.898**	0.774**	0.794**	0.685**	0.748**	0.046
KW	0.773**	0.772**	0.724**	0.778**	1	0.546**	0.864**	0.668**	0.658**	-0.598**	0.655**	0.663**	0.705**	0.702**	0.855**	0.878**	0.598**	0.667**	0.207*
FW	0.653**	0.692**	0.606**	0.689**	0.578**	1	0.882**	0.653**	0.645**	-0.495**	0.560**	0.571**	0.653**	0.650**	0.561**	0.631**	0.456**	0.512**	0.019
IW	0.794**	0.816**	0.740**	0.816**	0.859**	0.888**	1	0.750**	0.739**	-0.605**	0.691**	0.700**	0.774**	0.770**	0.802**	0.855**	0.599**	0.667**	0.132
yHW	0.971**	0.997**	0.873**	0.994**	0.797**	0.728**	0.853**	1	0.999**	-0.639**	0.823**	0.851**	0.875**	0.894**	0.769**	0.795**	0.675**	0.736**	0.022
EHW	0.972**	0.995**	0.896**	0.997**	0.800**	0.723**	0.851**	0.998**	1	-0.627**	0.818**	0.850**	0.870**	0.892**	0.762**	0.788**	0.675**	0.738**	0.029
wS	-0.878**	-0.869**	-0.757**	-0.865**	-0.688**	-0.638**	-0.715**	-0.865**	-0.863**	1	-0.516**	-0.544**	-0.552**	-0.568**	-0.738**	-0.741**	-0.634**	-0.676**	-0.066
SyMW	0.862**	0.903**	0.809**	0.903**	0.693**	0.615**	0.738**	0.901**	0.902**	-0.599**	1	0.994**	0.985**	0.977**	0.792**	0.793**	0.682**	0.743**	0.363**
SEMW	0.886**	0.919**	0.868**	0.926**	0.714**	0.627**	0.755**	0.917**	0.923**	-0.637**	0.991**	1	0.986**	0.988**	0.814**	0.817**	0.711**	0.779**	0.368**
SyHW	0.883**	0.924**	0.825**	0.923**	0.750**	0.698**	0.822**	0.930**	0.930**	-0.647**	0.988**	0.984**	1	0.996**	0.808**	0.820**	0.685**	0.750**	0.300**
SEHW	0.900**	0.934**	0.876**	0.940**	0.762**	0.697**	0.825**	0.940**	0.945**	-0.674**	0.981**	0.991**	0.993**	1	0.819**	0.830**	0.704**	0.775**	0.304**
oHDI	0.954**	0.953**	0.938**	0.966**	0.836**	0.655**	0.825**	0.955**	0.966**	-0.850**	0.853**	0.892**	0.880**	0.911**	1	0.981**	0.840**	0.907**	0.431**
nHDI	0.962**	0.952**	0.920**	0.962**	0.875**	0.697**	0.873**	0.958**	0.967**	-0.853**	0.849**	0.887**	0.882**	0.912**	0.985**	1	0.818**	0.884**	0.371**
Lif-Sat	0.801**	0.790**	0.838**	0.808**	0.582**	0.509**	0.611**	0.781**	0.798**	-0.699**	0.722**	0.768**	0.724**	0.767**	0.833**	0.801**	1	0.976**	0.640**
HLY	0.854**	0.850**	0.917**	0.871**	0.643**	0.573**	0.677**	0.843**	0.862**	-0.752**	0.778**	0.829**	0.784**	0.830**	0.896**	0.867**	0.980**	1	0.612**
HPI	0.229**	0.227**	0.431**	0.263**	0.162	-0.009	0.112	0.218*	0.250**	0.042	0.412**	0.445**	0.361**	0.402**	0.309**	0.264**	0.579**	0.543	1

** Significant at the 0.01 level (2-tailed). * Significant at the 0.05 level (2-tailed).

Underlining refers to Pearson correlation higher than Spearman correlation.

Sources: elaborations from table A.1.

In short, the wealth approach seems to be preferable not only on theoretical grounds – thanks to the relatively objectivity of what it can measure – but also for what concerns practical policy goals: it provides a battery of indicators which, at least with reference to 2005, are *de facto* more correlated not only with both GNI and (new and old) HDI, but also, at the same time, with the much more heterodox HPI. When it comes to the issue of sustainability, the wealth approach incorporates some of the concerns of the Happy Planet Index, while at the same time reducing some of the "eccentricities" which make this indicator difficult to accept – even, if not mostly, to the citizens of HPI top-ranker countries. A closer look at the changes in the country ranks produced by the different indicators (table 2) should help to clarify this point.

When passing from GNI to the wealth indicators, the changes in country ranks are modest and, by all means, easy to comprehend: so it is, for example, for the decline of Kuwait, whose GNI wealth is based on the extraction of oil (which counts as energy depletion); the country also has relatively low levels of knowledge and freedom wealth. The SEHW (sustainable expected human wealth) index presents more changes when compared to GNI, but these too are, after all, not difficult to explain (and to agree with): for example, the US fall being is due to its huge ecological footprint (almost four times the world average), or the rise of Jamaica, whose ecological footprint is instead very low. Although the top-twenty countries in SEHW differ significantly from those in GNI, we still have after all a familiar picture: in the SEHW ranking, there are thirteen countries from Europe (among which only one was a former socialist economy, the small Slovenia), three from East Asia (Singapore, Japan, South Korea), plus Canada, the United States, Israel, and Jamaica. The list of the top-twenty countries in HPI is instead puzzling, at the very least: twelve countries are from Latin America, and the remaining eight all are from Asia or Africa; Egypt (before the revolution!) looms as twelfth, an amazing thirty-five ranks above Germany; Honduras can boast an incredible tenth place, well thirty-eight points above Switzerland.[23] HDI's ranks are of course more reasonable but, it should be stressed, they ignore sustainability: among the consequences, we have that according to (new) HDI the United States rank fourth; when passing from GNI to HDI, New Zealand, a country with a very high per-capita ecological footprint (more than three times the world average), even increases its position, by nineteenth points, reaching up the third place in the world ranking.

23 Maybe the advocates of HPI should take a walk for the streets of Tegucigalpa… better with a bulletproof vest on!

Table 2. *Country ranks for selected indices (2005)*

Rank	GNI	yMW	EMW	yHW	EHW	SEHW	Hdi (new)	Lif Sat	HPI
1	Norway	United States^{+2}	United States^{+2}	United States^{+2}	United States^{+2}	Singapore^{+3}	Norway	Costa Rica^{+48}	Costa Rica^{+48}
2	Kuwait	Singapore^{+2}	Singapore^{+2}	Norway^{-1}	Norway^{-1}	Netherlands^{+4}	Australia^{+13}	Ireland^{+8}	Dominican R.$^{+65}$
3	United States	Norway^{-2}	Norway^{-2}	Switzerland^{+2}	Switzerland^{+2}	Germany^{+11}	New Zealand^{+19}	Norway^{-2}	Jamaica^{+58}
4	Singapore	Switzerland^{+1}	Switzerland^{+1}	Sweden^{+8}	Sweden^{+8}	Switzerland^{+1}	United States^{-1}	Denmark^{+4}	Guatemala^{+72}
5	Switzerland	Netherlands^{+1}	Netherlands^{+1}	Netherlands^{+1}	Netherlands^{+1}	Sweden^{+7}	Ireland^{+5}	Finland^{+13}	Vietnam^{+89}
6	Netherlands	United King.$^{+3}$	Sweden^{+6}	Ireland^{+4}	Ireland^{+4}	Austria^{+5}	Sweden^{+6}	Canada^{+1}	Colombia^{+53}
7	Canada	Ireland^{+3}	United King.$^{+2}$	Singapore^{-3}	Singapore^{-3}	France^{+10}	Canada	Australia^{+8}	Cuba^{+50}
8	Denmark	Sweden^{+4}	Ireland^{+2}	Canada^{-1}	Canada^{-1}	Belgium^{+5}	Germany^{+6}	United States^{-5}	El Salvador^{+62}
9	United King.	Canada^{-2}	Canada^{-2}	Germany^{+5}	Germany^{+5}	United King.	Netherlands^{-3}	Sweden^{+4}	Brazil^{+45}
10	Ireland	Austria^{+1}	Austria^{+1}	United King.$^{-1}$	United King.$^{-1}$	Japan^{+6}	Japan^{+6}	New Zealand^{12}	Honduras^{+75}
11	Austria	Denmark^{-3}	Germany^{+3}	Belgium^{+2}	Belgium^{+2}	Norway^{-10}	Switzerland^{-6}	Austria	Nicaragua^{+80}
12	Sweden	Germany^{+2}	France^{+5}	Austria^{-1}	Austria^{-1}	Korea (South)$^{+13}$	Finland^{+6}	Panama^{39}	Egypt^{+59}
13	Belgium	Belgium	Belgium	Denmark^{-5}	France^{+4}	Finland^{+5}	Israel^{+11}	Mexico^{+24}	Saudi Arabia^{+13}
14	Germany	Kuwait^{-12}	Denmark^{-6}	France^{+3}	Denmark^{-6}	Italy^{+5}	Denmark^{-6}	Netherlands^{-8}	Philippines^{+70}
15	Australia	France^{+2}	Kuwait^{-13}	Finland^{+3}	Australia	Ireland^{-5}	Belgium^{-2}	Saudi Arabia^{+11}	Argentina^{+28}
16	Japan	Finland^{+2}	Finland^{+2}	Australia^{-1}	Finland	Jamaica^{+45}	France^{+1}	Switzerland^{-11}	Indonesia^{+70}
17	France	Australia^{-2}	Japan^{-1}	Japan^{-1}	Japan^{-1}	Slovenia^{+6}	Korea (South)$^{+8}$	Belgium^{-4}	Panama^{+34}
18	Finland	Japan^{-2}	Australia^{-3}	Italy^{+1}	Italy^{+1}	Israel^{+6}	Spain^{+2}	Spain^{+2}	Laos^{+82}
19	Italy	Italy	Italy	Spain^{+1}	Spain^{+1}	Canada^{-12}	United King.$^{-10}$	Dominican R.$^{+48}$	China^{+56}
20	Spain	Spain	Spain	Kuwait^{-18}	New Zealand^{+2}	United States^{-17}	Austria^{-9}	Brazil^{+34}	Morocco^{+61}
21	Greece	Greece	Greece	New Zealand^{+1}	Greece	Slovakia^{+11}	Greece	Guatemala^{+55}	Sri Lanka^{+61}
22	New Zealand	Slovenia^{+1}	Israel^{+2}	Greece^{-1}	Kuwait^{-20}	Spain^{-2}	Italy^{-3}	United King.$^{-13}$	Mexico^{+15}
23	Slovenia	Israel^{+1}	New Zealand^{-1}	Israel^{+1}	Israel^{+1}	Portugal^{+4}	Czech R.$^{+6}$	Colombia^{+36}	Pakistan^{+69}
24	Israel	New Zealand^{-2}	Slovenia^{-1}	Korea (South)$^{+1}$	Korea (South)$^{+1}$	Hungary^{+6}	Singapore^{-20}	Germany^{-10}	Ecuador^{+39}
25	Korea (South)	Korea (South)	Korea (South)	Slovenia^{-2}	Slovenia^{-2}	Croatia^{+8}	Slovenia^{-2}	Argentina^{+18}	Jordan^{+47}
26	Saudi Arabia	Portugal^{+1}	Portugal^{+1}	Czech R.$^{+2}$	Portugal^{+1}	Greece^{-5}	Estonia^{+5}	Singapore^{-22}	Peru^{+40}
27	Portugal	Czech R.$^{+1}$	Czech R.$^{+1}$	Portugal	Czech R.$^{+1}$	Australia^{-12}	Hungary^{+3}	Nicaragua^{+64}	Tunisia^{+38}
28	Czech R.	Slovakia^{+4}	Slovakia^{+4}	Slovakia^{+4}	Slovakia^{+4}	Denmark^{-20}	Slovakia^{+4}	Israel^{-4}	Trini. and Tob^{+1}.
29	Trini. and Tob.	Estonia^{+2}	Estonia^{+2}	Estonia^{+2}	Estonia^{+2}	Costa Rica^{+20}	Portugal^{-2}	France^{-12}	Bangladesh^{+80}
30	Hungary	Hungary	Hungary	Hungary	Hungary	Lithuania^{+4}	Lithuania^{+5}	Honduras^{+55}	Moldova^{+58}
31	Estonia	Croatia^{+2}	Croatia^{+2}	Croatia^{+2}	Croatia^{+2}	Trini. and Tob.$^{-2}$	Poland^{+6}	Slovenia^{-8}	Malaysia^{+8}
32	Slovakia	Lithuania^{+2}	Poland^{+3}	Lithuania^{+2}	Poland^{+3}	Czech R.$^{-4}$	Kuwait^{-30}	Italy^{-13}	Tajikistan^{+72}
33	Croatia	Poland^{+2}	Lithuania^{+1}	Poland^{+2}	Lithuania^{+1}	Argentina^{+10}	Latvia^{+3}	Venezuela^{+12}	India^{+57}
34	Lithuania	Saudi Arabia^{-8}	Saudi Arabia^{-8}	Latvia^{+2}	Latvia^{+2}	Chile^{+6}	Chile^{+6}	Paraguay^{+45}	Venezuela^{+11}
35	Poland	Latvia^{+1}	Mexico^{+2}	Mexico^{+2}	Mexico^{+2}	Dominican R.$^{+32}$	Croatia^{-2}	Czech R.$^{-7}$	Nepal^{+81}
36	Latvia	Mexico^{+1}	Latvia	Botswana^{+5}	Chile^{+4}	Peru^{+30}	Argentina^{+7}	Greece^{-15}	Syrian Arab R.$^{+42}$
37	Mexico	Turkey^{+5}	Chile^{+3}	Chile^{+3}	Costa Rica^{+12}	Cuba^{+20}	Romania^{+10}	Japan^{-21}	Myanmar^{+76}
38	Russian Fed.	Botswana^{+3}	Turkey^{+4}	Bulgaria^{+6}	Uruguay^{+8}	New Zealand^{-16}	Uruguay^{+9}	Uruguay^{+9}	Algeria^{+21}
39	Malaysia	Chile^{+1}	Costa Rica^{+10}	Uruguay^{+7}	Bulgaria^{+5}	Polan^{-4}	Saudi Arabia^{-13}	Cuba^{+18}	Thailand^{+21}
40	Chile	Trini. and Tob.$^{-11}$	Uruguay^{+6}	Turkey^{+2}	Panama^{+11}	Malaysia^{-1}	Mexico^{-3}	Jamaica^{+21}	Netherlands^{-34}
41	Botswana	Malaysia^{-2}	Malaysia^{-2}	Costa Rica^{+8}	Argentina^{+2}	Bulgaria^{+3}	Malaysia^{-2}	China^{+34}	Uzbekistan^{+54}
42	Turkey	Uruguay^{+4}	Argentina^{+1}	Trini. and	Turkey	Latvia^{-6}	Bulgaria^{+2}	Trini. and	Chile^{-2}

43	Argentina	Bulgaria^{+1}	Bulgaria^{+1}	Tob.$^{-13}$ Argentina	Romania^{+4}	Sri Lanka^{+39}	Panama^{+9}	Tob.$^{-13}$ El Salvador^{+27}	Bolivia^{+30}
44	Bulgaria	Costa Rica^{+5}	Panama^{+7}	Panama^{+7}	Trini. and Tob.$^{-15}$	Philippines^{+40}	Serbia^{+9}	Egypt^{+28}	Armenia^{+30}
45	Venezuela	Argentina^{-2}	Trini. and Tob.$^{-16}$	Romania^{+2}	Malaysia^{-6}	Turkey^{-3}	Trini. and Tob.$^{-16}$	Kuwait^{-43}	Singapore^{-41}
46	Uruguay	Romania^{+1}	Romania^{+1}	Saudi Arabia^{-20}	Saudi Arabia^{-20}	Mexico^{-9}	Costa Rica^{+3}	Malaysia^{-7}	Yemen^{+50}
47	Romania	Panama^{+4}	Cuba^{+10}	Malaysia^{-8}	Serbia^{+6}	Georgia^{+33}	Belarus^{+3}	Bolivia^{+26}	Germany^{-33}
48	Iran	Russian Fed.$^{-10}$	Serbia^{+5}	Serbia^{+5}	Botswana^{-7}	Saudi Arabia^{-22}	Albania^{+16}	Vietnam^{+46}	Switzerland^{-43}
49	Costa Rica	Belarus^{+1}	Belarus^{+1}	South Africa^{+3}	Brazil^{+5}	Serbia^{+4}	Bosnia-Herz^{+13}	Poland^{-14}	Sweden^{-37}
50	Belarus	Cuba^{+7}	Brazil^{+4}	Brazil^{+4}	Macedonia^{+6}	Romania^{-3}	Ukraine^{+18}	Ecuador^{+13}	Albania^{+14}
51	Panama	Serbia^{+2}	Russian Fed.$^{-13}$	Russian Fed.$^{-13}$	Russian Fed.$^{-13}$	Kuwait^{-49}	Kazakhstan^{+5}	Croatia^{-18}	Paraguay^{+28}
52	South Africa	South Africa	Macedonia^{+4}	Macedonia^{+4}	Albania^{+12}	Brazil^{+2}	Peru^{+14}	Korea (South)$^{-27}$	Austria^{-41}
53	Serbia	Brazil^{+1}	Botswana^{-12}	Belarus^{-3}	Cuba^{+4}	Colombia^{+6}	Russian Fed^{-15}	Chile^{-13}	Serbia
54	Brazil	Macedonia^{+2}	Venezuela^{-9}	Jamaica^{+7}	Jamaica^{+7}	Panama^{-3}	Georgia^{+26}	Thailand^{+6}	Finland^{-36}
55	Kazakhstan	Venezuela^{-10}	Bosnia-Herz.$^{+7}$	Albania^{+9}	Bosnia-Herz.$^{+7}$	Albania^{+9}	Brazil^{-1}	Laos^{+45}	Croatia^{-21}
56	Macedonia	Bosnia-Herz.$^{+6}$	Albania^{+8}	Bosnia-Herz.$^{+6}$	Belarus^{-6}	El Salvador^{+14}	Macedonia^{+1}	Kazakhstan^{-1}	Kyrgyzstan^{+43}
57	Cuba	Jamaica^{+4}	Jamaica^{+4}	Cuba	Venezuela^{-12}	South Africa^{-5}	Jamaica^{+4}	Slovakia^{-25}	Belgium^{-44}
58	Algeria	Thailand^{+2}	Colombia^{+1}	Venezuela^{-13}	Peru^{+8}	Estonia^{-27}	Ecuador^{+6}	Uzbekistan^{+37}	Bosnia-Herz.$^{+4}$
59	Colombia	Colombia	Thailand^{+1}	Thailand^{+1}	South Africa^{-7}	Armenia^{+15}	Armenia^{+15}	Serbia^{-6}	Slovenia^{-36}
60	Thailand	Albania^{+4}	Tunisia^{+5}	Peru^{+6}	Dominican R.^{7}	Tunisia^{+5}	Venezuela^{-15}	Jordan^{-12}	Israel^{-36}
61	Jamaica	Tunisia^{+4}	Dominican R.$^{+6}$	Dominican R.$^{+6}$	Thailand^{-1}	Thailand^{-1}	Iran^{-13}	Romania^{+14}	Korea (South)$^{-36}$
62	Bosnia-Herz.	Dominican R.$^{+5}$	Peru^{+4}	Colombia^{-3}	Colombia^{-3}	Morocco^{+19}	Colombia^{-3}	Bosnia-Herz.	Italy^{-43}
63	Ecuador	Peru^{+3}	South Africa^{-11}	Ukraine^{+5}	Ecuador	Jordan^{+9}	Turkey^{-21}	Peru^{+4}	Romania^{-16}
64	Albania	Iran^{-16}	Iran^{-16}	Namibia^{+5}	Tunisia^{+1}	Ecuador^{-1}	Azerbaijan^{+13}	Syrian Arab R.$^{+16}$	France^{-47}
65	Tunisia	Ecuador^{-2}	Ecuador^{-2}	Ecuador^{-2}	Ukraine^{+3}	Bosnia-Herz.$^{-3}$	Jordan^{+7}	Tunisia	Georgia^{+15}
66	Peru	Namibia^{+3}	El Salvador^{+4}	El Salvador^{+4}	El Salvador^{+4}	Venezuela^{-21}	Algeria^{-8}	Russian Fed.$^{-28}$	Slovakia^{-34}
67	Dominican R.	El Salvador^{+3}	Ukraine^{+1}	Tunisia^{-2}	Iran^{-19}	Indonesia^{+19}	Tunisia^{-2}	Myanmar^{+46}	United King.$^{-58}$
68	Ukraine	Ukraine	Jordan^{+4}	Iran^{-20}	Namibia^{+1}	Algeria^{-10}	Dominican R.$^{-1}$	Portugal^{-41}	Japan^{-52}
69	Namibia	Jordan^{+3}	Algeria^{-11}	Jordan^{+3}	Jordan^{+4}	Botswana^{-28}	Sri Lanka^{+13}	Belarus^{-19}	Spain^{-49}
70	El Salvador	Algeria^{-12}	Namibia^{-1}	Armenia^{+4}	Armenia^{+4}	Guatemala^{+6}	El Salvador^{+1}	Lithuania^{-36}	Poland^{-35}
71	Egypt	Kazakhstan^{-16}	Armenia^{+3}	Kazakhstan^{-16}	Georgia^{+9}	Moldova^{+17}	Thailand^{-11}	Hungary^{-41}	Ireland^{-61}
72	Jordan	Armenia^{+2}	China^{+3}	Georgia^{+8}	Sri Lanka^{+10}	Uruguay^{-26}	Bolivia^{+2}	Indonesia^{+14}	Iraq^{+17}
73	Bolivia	Guatemala^{+3}	Paraguay^{+6}	Paraguay^{+6}	Paraguay^{+6}	Pakistan^{+19}	Philippines^{+11}	Mongolia^{+14}	Cambodia^{+32}
74	Armenia	Paraguay^{+5}	Guatemala^{+2}	Sri Lanka^{+8}	Algeria^{-16}	India^{+16}	Paraguay^{+6}	Moldova^{+14}	Iran^{-26}
75	China	China	Kazakhstan^{-20}	Algeria^{-17}	Kazakhstan^{-20}	Russian Fed.$^{-37}$	China	Estonia^{-44}	Bulgaria^{-31}
76	Guatemala	Egypt^{-5}	Sri Lanka^{+6}	Guatemala	Philippines^{+8}	Egypt^{-5}	Moldova^{+12}	Iran^{-28}	Turkey^{-34}
77	Azerbaijan	Sri Lanka^{5}	Egypt^{-6}	Bolivia^{-4}	Guatemala^{-1}	Ukraine^{-9}	Botswana^{-36}	Morocco^{+5}	Azerbaijan
78	Syrian Arab R.	Georgia^{+2}	Georgia^{+2}	Philippines^{+6}	China^{-3}	Honduras^{+7}	Mongolia^{+9}	Pakistan^{+14}	Lithuania^{-44}
79	Paraguay	Morocco^{+2}	Morocco^{+2}	Egypt^{-8}	Egypt^{-8}	Tajikistan^{+25}	Uzbekistan^{+17}	Algeria^{-21}	Norway^{-78}
80	Georgia	Honduras^{+5}	Honduras^{+5}	Honduras^{+5}	Honduras^{+5}	Belarus^{-30}	South Africa^{-28}	Turkey^{-38}	Canada^{-73}
81	Morocco	Bolivia^{-8}	Philippines^{+3}	China^{-6}	Bolivia^{-8}	Iran^{-33}	Egypt^{-9}	India^{+9}	Hungary^{-51}
82	Sri Lanka	Philippines^{+2}	Bolivia^{-9}	Morocco^{-1}	Morocco^{-1}	Macedonia^{-26}	Honduras^{+3}	Macedonia^{-26}	Kazakhstan^{-27}

Table 2. *(continues)*

Rank	GNI	yMW	EMW	yHW	EHW	SEHW	Hdi (new)	Lif Sat	HPI
83	Angola	Syrian Arab R.$^{-5}$	Syrian Arab R.$^{-5}$	Moldova^{+5}	Moldova^{+5}	Bangladesh^{+26}	Namibia^{-14}	Bulgaria^{-39}	Czech R.$^{-55}$
84	Philippines	Moldova^{+4}	Indonesia^{+2}	Mongolia^{+3}	Mongolia^{+3}	China^{-9}	Syrian Arab R.$^{-6}$	Albania^{-19}	Mauritania^{+14}
85	Honduras	Indonesia^{+1}	Moldova^{+3}	Indonesia^{+1}	Indonesia^{+1}	Bolivia^{-12}	Kyrgyzstan^{+14}	Philippines^{+1}	Ukraine^{-17}
86	Indonesia	Nicaragua^{+5}	Nicaragua^{+5}	Nicaragua^{+5}	Syrian Arab R.$^{-8}$	Kyrgyzstan^{+13}	Indonesia	Latvia^{-50}	Senegal^{+17}
87	Mongolia	Mongolia	Mongolia	Syrian Arab R.$^{-9}$	Nicaragua^{+4}	Paraguay^{-8}	Tajikistan^{+17}	Sri Lanka^{-5}	Greece^{-66}
88	Moldova	India^{+2}	Pakistan^{+4}	India^{+2}	India^{+2}	Namibia^{-19}	Nicaragua^{+3}	Chad^{+22}	Portugal^{-61}
89	Iraq	Pakistan^{+3}	India^{+1}	Pakistan^{+3}	Pakistan^{+3}	Vietnam^{+5}	Vietnam^{+5}	Iraq	Uruguay^{-43}
90	India	Cameroon^{+7}	Vietnam^{+4}	Azerbaijan^{-13}	Azerbaijan^{-13}	Laos^{+10}	Morocco^{-9}	Nepal^{+26}	Ghana^{+18}
91	Nicaragua	Vietnam^{+3}	Azerbaijan^{-14}	Kyrgyzstan^{+8}	Vietnam^{+3}	Kazakhstan^{-36}	Guatemala^{-15}	Ukraine^{-23}	Latvia^{-55}
92	Pakistan	Azerbaijan^{-15}	Kyrgyzstan^{+7}	Cameroon^{+5}	Kyrgyzstan^{+7}	Cambodia^{+13}	India^{-2}	Azerbaijan^{-15}	Australia^{-77}
93	Congo	Laos^{+7}	Laos^{+7}	Vietnam^{+1}	Tajikistan^{+11}	Nicaragua^{-2}	Congo	Bangladesh^{+16}	New Zealand^{-71}
94	Vietnam	Kyrgyzstan^{+5}	Tajikistan^{+10}	Tajikistan^{+10}	Laos^{+6}	Syrian Arab R.$^{-16}$	Pakistan^{-2}	Yemen^{+2}	Belarus^{-44}
95	Uzbekistan	Senegal^{+8}	Cameroon^{+2}	Kenya^{+11}	Cameroon^{+2}	Yemen^{+1}	Cambodia^{+10}	Tajikistan^{+9}	Denmark^{-87}
96	Yemen	Mauritania^{+8}	Cambodia^{+9}	Senegal^{+7}	Senegal^{+7}	Nepal^{+20}	Laos^{+4}	Armenia^{-22}	Mongolia^{-9}
97	Cameroon	Tajikistan^{+2}	Yemen^{-1}	Laos^{+3}	Cambodia^{+8}	Benin^{+10}	Kenya^{+9}	Kyrgyzstan^{+2}	Russian Fed.$^{-59}$
98	Mauritania	Cambodia^{+7}	Senegal^{+5}	Cambodia^{+7}	Kenya^{+8}	Kenya^{+8}	Ghana^{+11}	South Africa^{-46}	Malawi^{+27}
99	Kyrgyzstan	Yemen^{-3}	Mauritania^{-1}	Ghana^{+9}	Ghana^{+9}	Malawi^{+25}	Cameroon^{-2}	Mauritania^{-1}	Chad^{+11}
100	Laos	Sudan^{+1}	Sudan^{+1}	Mauritania^{-2}	Benin^{+7}	Cameroon^{-3}	Bangladesh^{+9}	Cambodia^{-5}	Macedonia^{-44}
101	Sudan	Kenya^{+5}	Benin^{+6}	Benin^{+6}	Mauritania^{-3}	Angola^{-18}	Madagascar^{+18}	Nigeria^{+1}	Congo^{-8}
102	Nigeria	Angola^{-19}	Bangladesh^{+7}	Angola^{-19}	Yemen^{-6}	Senegal^{+1}	Benin^{+5}	Ghana^{+6}	Madagascar^{+17}
103	Senegal	Benin^{+4}	Kenya^{+3}	Yemen^{-7}	Bangladesh^{+6}	Zambia^{+8}	Togo^{+18}	Botswana^{-62}	United States^{-100}
104	Tajikistan	Ghana^{+4}	Ghana^{+4}	Nigeria^{-2}	Sudan^{-3}	Azerbaijan^{-27}	Mauritania^{-6}	Namibia^{-35}	Nigeria^{-2}
105	Cambodia	Nigeria^{-3}	Nepal^{+11}	Bangladesh^{+4}	Tanzania^{+7}	Tanzania^{+7}	Myanmar^{+8}	Sudan^{-4}	Guinea^{+12}
106	Kenya	Bangladesh^{3}	Myanmar^{+7}	Tanzania^{+6}	Nepal^{+10}	Togo^{+15}	Yemen^{-10}	Senegal^{-3}	Uganda^{+12}
107	Benin	Tanzania^{+5}	Angola^{-24}	Zambia^{+4}	Angola^{-24}	Mongolia^{-20}	Nigeria^{-5}	Uganda^{+12}	South Africa^{-55}
108	Ghana	Burkina Faso^{+6}	Tanzania^{+4}	Sudan^{-7}	Nigeria^{-6}	Ghana	Nepal^{+8}	Malawi^{+16}	Rwanda^{+12}
109	Bangladesh	Zambia^{+2}	Burkina Faso^{+5}	Madagascar^{+10}	Madagascar^{+10}	Madagascar^{+10}	Senegal^{-6}	Zambia^{+2}	Congo-D.Rep.$^{+21}$
110	Chad	Myanmar^{+3}	Nigeria^{-8}	Burkina Faso^{+4}	Myanmar^{+3}	Myanmar^{+3}	Uganda^{+8}	Angola^{-27}	Sudan^{-9}
111	Zambia	Mali^{+4}	Madagascar^{+8}	Nepal^{+5}	Zambia	Rwanda^{+9}	Angola^{-28}	Georgia^{-31}	Ethiopia^{+14}
112	Tanzania	Nepal^{+4}	Guinea^{+5}	Mali^{+3}	Burkina Faso^{+2}	Nigeria^{-10}	Tanzania	Rwanda^{+8}	Kenya^{-6}
113	Myanmar	Uganda^{+5}	Mali^{+2}	Uganda^{+5}	Uganda^{+5}	Mauritania^{-15}	Zambia^{-2}	Centr. Afr. R.$^{+9}$	Cameroon^{-16}
114	Burkina Faso	Madagascar^{+5}	Togo^{+7}	Myanmar^{-1}	Togo^{+7}	Congo^{-21}	Sudan^{-12}	Guinea^{+3}	Zambia^{-3}
115	Mali	Guinea^{+2}	Zambia^{-4}	Guinea^{+2}	Mali	Sierra Leone^{+12}	Malawi^{+9}	Ethiopia^{+11}	Kuwait^{-113}
116	Nepal	Rwanda^{+4}	Uganda^{+2}	Togo^{+5}	Guinea^{+1}	Uganda^{+2}	Rwanda^{+4}	Cameroon^{-19}	Niger^{+10}
117	Guinea	Togo^{+4}	Iraq^{-28}	Rwanda^{+3}	Iraq^{-28}	Guinea	Guinea	Congo-D.Rep.$^{+13}$	Angola^{-34}
118	Uganda	Centr. Afr. R.$^{+4}$	Rwanda^{+2}	Malawi^{+6}	Uzbekistan^{-23}	Iraq^{-29}	Centr. Afr. R.$^{+4}$	Mozambique^{+5}	Estonia^{-87}
119	Madagascar	Malawi^{+5}	Uzbekistan^{-24}	Centr. Afr. R.$^{+3}$	Rwanda^{+1}	Mozambique^{+4}	Chad^{-8}	Mali^{-4}	Mali^{-4}
120	Rwanda	Niger^{+6}	Malawi^{+4}	Iraq^{-31}	Malawi^{+4}	Mali^{-5}	Sierra Leone^{+7}	Niger^{+6}	Mozambique^{+3}
121	Togo	Mozambique^{+2}	Ethiopia^{+4}	Niger^{+5}	Centr. Afr. R.$^{+1}$	Sudan^{-20}	Ethiopia^{+4}	Madagascar^{-2}	Benin^{-14}
122	Centr. Afr. R.	Ethiopia^{+3}	Niger^{+4}	Sierra Leone^{+5}	Ethiopia^{+3}	Burkina Faso^{-8}	Burkina Faso^{-8}	Kenya^{-16}	Togo^{-1}
123	Mozambique	Iraq^{-34}	Centr. Afr. R.$^{-1}$	Mozambique	Niger^{+3}	Ethiopia^{+2}	Mali^{-8}	Congo^{-30}	Sierra Leone^{+4}
124	Malawi	Sierra Leone^{+3}	Mozambique^{-1}	Ethiopia^{+1}	Mozambique^{-1}	Uzbekistan^{-29}	Mozambique^{-1}	Burkina Faso^{-10}	Centr. Afr. R.$^{-2}$
125	Ethiopia	Uzbekistan^{-30}	Sierra Leone^{+2}	Uzbekistan^{-30}	Sierra Leone^{+2}	Centr. Afr. R.$^{-3}$	Niger^{+1}	Sierra Leone^{+2}	Burkina Faso^{-11}
126	Niger	Chad^{-16}	Chad^{-16}	Zimbabwe^{+2}	Congo^{-33}	Congo-D.Rep.$^{+4}$	Burundi^{+3}	Benin^{-19}	Burundi^{+3}
127	Sierra Leone	Zimbabwe^{+1}	Congo^{-34}	Chad^{-17}	Chad^{-17}	Niger^{-1}	Congo-D.Rep.$^{+3}$	Burundi^{+2}	Namibia^{-58}
128	Zimbabwe	Congo^{-35}	Zimbabwe	Congo^{-35}	Zimbabwe	Burundi^{+1}	Zimbabwe	Zimbabwe	Botswana^{-87}
129	Burundi	Burundi	Burundi	Burundi	Burundi	Zimbabwe^{-1}	-	Togo^{-8}	Tanzania^{-17}
130	Congo-D.Rep.	Congo-D.Rep.	Congo-D.Rep.	Congo-D.Rep.	Congo-D.Rep.	Chad^{-20}	-	Tanzania^{-18}	Zimbabwe^{-2}

All indicators are per capita.

Superscript indicates the change in rank order from GNI.

Sources: elaborations from table A.1.

6. CONCLUSIONS

The article critically reviews the most popular alternatives to GDP and proposes a new measurement framework which can yield indices more internally consistent than those derived from capability or utilitarianism, or from a mix of these approaches, and by far more inclusive than GDP. The main argument is that wealth, rather than capability or utility, is the proper dimension to be objectively measured (as far as objectivity exists) and thus to be conveyed into a coherent and useful index: within the wealth approach, it is not difficult – for example, through an empirical common sense criterion – to find agreement on the basic dimensions of wealth and, hopefully, also on their measurement.

The first part of the article develops a criticism of the currently most popular indices alternative to GDP – Human Development Index, Genuine Progress Indicator, and Happy Planet Index – which is based on the argument, relatively new, of their faulty conceptual foundations: a case is made that both the capability approach and utilitarianism are not suitable to be conveyed into an objective measure which can serve as a guide for policy makers. In the second part of the article, it is argued that instead social and ecological goals, the main concerns motivating the indices alternative to GDP, can be coherently included into an extended wealth approach, i.e., into the same conceptual framework of GDP. This improvement upon the wealth approach is developed into a multi-layer measurement scheme, from which composite wealth indices can be produced: these indices can incorporate social and ecological goals without an alteration in their conceptual foundations and, at the same time, without falling in the thorny swamp of arbitrary weighting.

The new indices proposed are yearly material wealth (an amended version of GNI to include depletion of natural resources and the costs of pollution), biological wealth (measured through life expectancy) and thus expected material wealth (or physical wealth), a linear combination of biological and yearly material wealth (the amount of material wealth expected to be produced by an individual during his/her lifetime). More provisional estimates of immaterial wealth are also presented, namely a combination of wealth in knowledge and wealth in freedom, which are then computed together with material wealth to produce estimates of human wealth. In this way, social and human rights goals, i.e. the broader concept of human development, can be incorporated into the composite wealth indicator without raising serious problems of measurement and trade-offs, not least because the foundations remain essentially unchanged. Furthermore, all these indicators can easily be revised through measures of sustainability: the product are indices of sustainable (material, biological, immaterial, human) wealth which explicitly incorporate ecological goals, once again remaining safely within the conceptual framework of the wealth approach.

An application to the world countries in 2005 is also presented and discussed. The results and the comparisons with other measures (GNI, HDI, HLY, HPI) suggest that, also on empirical grounds, the new wealth indicators can serve as an effective guide for policy makers. This is after all what indicators should be used for, and why they were proposed, since the invention of GDP in the 1930s onwards.

APPENDIX. THE WORLD WEALTH INDICES: SOURCES AND ESTIMATES FOR 2005

Table A.1 reports an estimate of wealth indices for most of the world countries (130 cases), for the year 2005, which at the present is the most recent year for which all the necessary data are accessible and/or can be compiled.

In order to estimate yearly material wealth (yMW), data on GNI (gross national income), CFC (consumption of fixed capital), MD (mineral depletion), ED (energy depletion), NFD (net forest depletion), CDD (carbon oxide damage), PED (particular emission damage), as well as the deflators from national currency to international PPP dollars, are taken from the World Bank dataset (World Bank, 2011); WPD (water pollution damage) has been estimated as the product of the organic water pollutant emissions (from the same source) and the average cost per kg/day of water pollutant. This latter was in turn estimated using data on total potential annual value losses due to water pollution (losses in recreational water usage, waterfront real estate, spending on recovery of threatened and endangered species, and drinking water) for the United States in 2008 (Dodds *et al.*, 2009); the total was divided by the US organic water pollutant emission in 2008 (World Bank, 2011), and extrapolated backward to 2005 using the cost of living index; the average cost per kg/day of water pollutant for the United States was then applied to other countries after being converted through PPP coefficients (from the same source).

Data on life expectancy at birth and mean years of schooling, as well as the old and new HDI, are from the UNDP human development latest report (UNDP, 2010). Data on freedom rates are from the Freedomhouse 2005 freedom report (Freedomhouse, 2006). World sustainability is calculated from the ecological footprint and biocapacity data taken from the happy planet index report (Abdallah *et al.*, 2009); from the same source, estimates on Life Sat (life satisfaction), HLY (Happy Life Years) and HPI (Happy Planet Index) are taken. At the moment, the last year for which the HPI report is available is 2005, and this is the reason why we must focus our analysis on 2005: as mentioned, the closest year when all data are available.

Table A.1. *Wealth indices and comparison with alternative indices, by independent country (2005)*

Country	Population	GNI	yMW	BW	EMW	KW	FW	IW	yHW	EHW
		2005 PPP	2005 PPP		2005 PPP				2005 PPP	2005 PPP
	(million)	$	$	(years)	$	(years)	(years)	(years)	$	$
Albania	3,154	6197	5500	76,2	419107	10,2	7,9	9,0	6915	526941
Algeria	32,854	6820	3843	71,7	275567	6,4	3,8	4,9	3863	276973
Angola	16,095	3238	1191	45,5	54173	4,4	3,8	4,1	1134	51588
Argentina	38,747	10424	8027	74,8	600407	8,9	9,5	9,2	10210	763683
Armenia	3,018	4274	3636	73,1	265807	10,8	5,4	7,7	4275	312526
Australia	20,400	31513	24820	81,1	2012887	11,9	11,2	11,5	35164	2851764
Austria	8,233	33052	27781	79,4	2205851	9,6	11,2	10,4	37321	2963257
Azerbaijan	8,392	3937	1581	69,4	109754	10,2	3,8	6,2	1718	119217
Bangladesh	153,281	1123	997	64,6	64408	4,2	6,3	5,1	1014	65490
Belarus	9,776	8543	7443	68,7	511323	9,3	2,2	4,5	7278	500027
Belgium	10,479	32335	27317	78,9	2155319	10,6	11,2	10,9	37595	2966246
Benin	8,490	1205	1093	60,2	65792	3,2	9,5	5,5	1138	68512
Bolivia	9,182	4321	2919	64,7	188887	8,3	7,9	8,1	3510	227103
Bosnia-Herz.	3,781	6496	5730	74,8	428632	8,7	7,1	7,8	6801	508729
Botswana	1,836	10831	9229	50,9	469768	8,3	9,5	8,9	11557	588238
Brazil	186,831	8228	6986	71,7	500895	6,6	8,7	7,6	8175	586175
Bulgaria	7,740	9837	8188	72,7	595257	9,7	10,3	10,0	10828	787218
Burkina Faso	13,933	1023	931	52,1	48522	1,3	5,4	2,7	803	41847
Burundi	7,859	311	258	49,1	12664	2,3	4,6	3,3	232	11400
Cambodia	13,956	1377	1262	59,4	74977	5,7	3,8	4,7	1247	74055
Cameroon	17,795	1904	1619	50,6	81916	5,4	3,0	4,0	1534	77636
Canada	32,312	34377	28062	80,3	2253404	11,3	11,2	11,2	39241	3151041
Centr. Afr. R.	4,191	643	597	46,2	27587	3,2	3,8	3,5	546	25230
Chad	10,146	1108	403	48,5	19542	1,5	3,8	2,4	341	16526
Chile	16,295	11094	8579	78,2	670901	9,3	11,2	10,2	11438	894423
China	1304,500	4131	3456	72,6	250914	7,1	2,2	3,9	3257	236441
Colombia	44,946	6736	5502	72,3	397777	6,7	6,3	6,5	6058	438025
Congo	3,610	2196	325	53,3	17316	5,8	5,4	5,6	340	18140
Congo-D.Rep.	58,741	255	227	47,6	10794	3,4	3,0	3,2	203	9669
Costa Rica	4,327	8648	8051	78,5	632026	8,0	11,2	9,4	10362	813390
Croatia	4,443	14824	12732	75,5	961262	8,7	9,5	9,1	16111	1216412
Cuba	11,260	7462	7231	77,9	563273	9,9	1,4	3,7	6697	521718
Czech R.	10,234	19452	15441	75,9	1171983	13,1	11,2	12,1	22424	1701979
Denmark	5,416	33677	27428	77,9	2136612	10,1	11,2	10,6	37302	2905808
Dominican R.	9,470	5893	5160	72,1	372061	6,5	9,5	7,9	6131	442081
Ecuador	13,061	6385	4627	74,7	345604	7,3	7,9	7,6	5417	404647
Egypt	72,850	4561	3428	69,5	238247	5,6	3,8	4,6	3377	234705
El Salvador	6,668	4992	4433	70,7	313434	6,7	8,7	7,6	5204	367920
Estonia	1,346	15871	13569	72,3	981055	11,9	11,2	11,5	19224	1389912
Ethiopia	75,173	627	540	53,8	29039	1,5	4,6	2,6	465	24999
Finland	5,246	30826	26132	79,0	2064454	10,2	11,2	10,7	35626	2814442
France	60,873	30908	26869	80,4	2160253	9,8	11,2	10,5	36275	2916496
Georgia	4,473	3555	3190	71,6	228400	12,1	7,1	9,3	4067	291185
Germany	82,469	31736	27336	79,4	2170464	12,3	11,2	11,7	39057	3101086
Ghana	22,535	1146	1031	56,5	58228	6,5	9,5	7,9	1225	69187
Greece	11,104	24224	21290	78,7	1675528	9,8	10,3	10,1	28224	2221259
Guatemala	12,710	4014	3542	69,6	246516	3,6	6,3	4,7	3517	244791
Guinea	9,003	882	744	56,2	41820	1,6	3,8	2,5	633	35570
Honduras	6,834	3144	2923	71,5	208978	5,9	7,9	6,8	3282	234658
Hungary	10,087	16055	13401	72,9	976933	11,5	11,2	11,3	18822	1372138
India	1094,583	2292	1934	62,7	121259	4,0	8,7	5,9	2060	129165
Indonesia	220,558	2820	2159	69,7	150516	5,1	7,1	6,0	2315	161327
Iran	69,087	9144	5016	70,6	354117	6,1	3,0	4,3	4833	341217
Iraq	29,267	2417	534	68,5	36584	5,3	3,0	4,0	505	34587
Ireland	4,159	33081	28961	78,9	2285040	11,4	11,2	11,3	40588	3202365
Israel	6,924	23166	19953	80,3	1602220	11,9	9,5	10,6	27175	2182182
Italy	58,607	28056	23558	80,8	1903473	8,8	11,2	9,9	30997	2504593
Jamaica	2,655	6590	5722	71,3	408009	9,0	8,7	8,9	7152	509935
Japan	127,773	31026	24567	82,4	2024299	11,1	10,3	10,7	33562	2765544
Jordan	5,412	4450	3943	71,9	283487	8,0	5,4	6,6	4372	314362
Kazakhstan	15,147	7832	3783	64,8	245153	10,1	3,8	6,2	4102	265820
Kenya	35,599	1347	1205	52,5	63240	6,5	7,9	7,2	1378	72350
Korea (South)	48,294	22688	19535	78,6	1535441	11,1	10,3	10,7	26688	2097679
Kuwait	2,535	47440	27268	77,3	2107796	6,0	5,4	5,7	28729	2220752
Kyrgyzstan	5,144	1666	1440	67,1	96648	9,2	3,8	5,9	1536	103085
Laos	5,664	1627	1487	63,6	94581	4,2	2,2	3,0	1317	83747
Latvia	2,301	12872	10384	71,7	744508	10,1	10,3	10,2	13865	994122
Lithuania	3,414	13857	11859	71,8	851486	10,6	9,5	10,0	15708	1127832
Macedonia	2,034	7585	6701	73,8	494526	7,6	7,9	7,7	7910	583788
Madagascar	18,643	820	746	58,9	43943	5,2	7,9	6,4	818	48195
Malawi	13,226	638	592	51,1	30238	3,4	6,3	4,6	583	29773
Malaysia	25,653	11207	8227	73,7	606331	8,9	6,3	7,5	9568	705159
Mali	11,611	965	881	47,4	41749	1,2	9,5	3,4	799	37886

Table A.1. *(continue, 1)*

Country	Population (million)	GNI 2005 PPP $	yMW 2005 PPP $	BW (years)	EMW 2005 PPP $	KW (years)	FW (years)	IW (years)	yHW 2005 PPP $	EHW 2005 PPP $
Mauritania	2,963	1744	1288	56,4	72652	3,3	3,8	3,5	1182	66691
Mexico	103,089	12379	10002	75,5	755178	7,9	9,5	8,7	12389	935378
Moldova	3,877	2453	2201	67,9	149415	9,4	7,1	8,2	2654	180229
Mongolia	2,554	2550	2004	65,5	131230	8,2	9,5	8,8	2502	163883
Morocco	30,143	3543	3171	70,4	223271	3,9	5,4	4,6	3122	219765
Mozambique	20,533	640	555	47,7	26490	1,1	7,1	2,8	483	23060
Myanmar	47,967	1026	913	60,6	55329	3,5	1,4	2,2	760	46083
Namibia	2,020	5277	4599	58,6	269512	7,0	8,7	7,8	5447	319214
Nepal	27,094	963	874	65,3	57104	2,7	4,6	3,5	802	52375
Netherlands	16,320	35274	29312	79,4	2327352	11,0	11,2	11,1	40713	3232602
New Zealand	4,134	23513	19938	79,8	1591018	12,3	11,2	11,7	28486	2273193
Nicaragua	5,463	2248	2038	71,9	146566	5,1	7,9	6,3	2228	160180
Niger	13,264	596	556	49,7	27628	1,3	7,9	3,2	498	24765
Nigeria	141,356	1525	1002	47,3	47375	5,0	6,3	5,6	1048	49556
Norway	4,623	47636	33799	80,0	2703936	12,7	11,2	11,9	48691	3895253
Pakistan	155,772	2230	1910	65,6	125289	4,5	3,8	4,1	1824	119674
Panama	3,232	8516	7844	75,2	589868	9,0	10,3	9,6	10193	766508
Paraguay	5,899	3870	3478	71,3	247969	7,0	7,9	7,4	4038	287888
Peru	27,274	6027	5112	72,5	370642	9,2	8,7	9,0	6421	465502
Philippines	84,566	3202	2805	71,1	199427	8,3	8,7	8,5	3444	244865
Poland	38,165	13481	11404	75,2	857557	9,7	11,2	10,4	15358	1154894
Portugal	10,549	20978	17475	78,2	1366525	7,2	11,2	9,0	21959	1717216
Romania	21,634	9276	7891	72,0	568172	10,1	8,7	9,4	10122	728785
Russian Fed.	143,150	11558	7631	65,5	499838	8,7	3,8	5,8	8061	528023
Rwanda	9,234	766	695	48,4	33642	2,8	3,8	3,3	626	30293
Saudi Arabia	23,119	21613	10905	72,2	787338	7,2	1,4	3,1	9731	702570
Senegal	11,770	1519	1335	54,9	73285	3,2	8,7	5,3	1370	75207
Serbia	7,441	8407	7146	73,6	525946	9,4	8,7	9,0	9018	663736
Sierra Leone	5,586	566	508	46,4	23584	2,6	7,1	4,3	490	22743
Singapore	4,266	42218	35980	79,6	2864006	8,1	5,4	6,6	39991	3183298
Slovakia	5,387	15496	13880	74,2	1029882	11,6	11,2	11,4	19537	1449672
Slovenia	2,001	23293	20173	77,5	1563370	8,9	11,2	10,0	26614	2062574
South Africa	46,892	8480	7039	51,8	364624	7,7	10,3	8,9	8828	457302
Spain	43,398	26991	22683	80,3	1821471	9,8	11,2	10,5	30624	2459116
Sri Lanka	19,668	3502	3307	73,7	243726	7,9	7,9	7,9	3935	290027
Sudan	36,900	1557	1207	57,3	69174	2,8	1,4	2,0	988	56614
Sweden	9,024	32958	28881	80,5	2324953	11,7	11,2	11,4	40742	3279743
Switzerland	7,437	39157	32678	81,3	2656710	10,0	11,2	10,6	44334	3604390
Syrian Arab R.	18,894	3879	2551	73,6	187728	4,8	1,4	2,6	2184	160752
Tajikistan	6,550	1427	1288	65,6	84524	10,0	3,8	6,2	1395	91487
Tanzania	38,478	1038	947	53,7	50830	4,8	7,1	5,8	1004	53911
Thailand	63,003	6724	5643	68,4	385979	5,9	8,7	7,2	6458	441714
Togo	6,239	729	652	61,4	40022	4,8	3,8	4,3	628	38569
Trini. and Tob.	1,324	18979	8504	68,7	584219	8,8	7,9	8,3	10352	711200
Tunisia	10,029	6076	5207	73,5	382721	5,6	3,8	4,6	5130	377032
Turkey	72,065	10710	9372	71,4	669154	6,0	7,9	6,9	10557	753794
Uganda	28,947	871	769	50,3	38661	4,3	5,4	4,8	768	38612
Ukraine	47,105	5520	4366	67,9	296445	11,1	7,1	8,9	5459	370691
United King.	60,226	33279	29000	79,0	2291021	9,1	11,2	10,1	38462	3038532
United States	296,507	43023	37087	78,7	2918766	12,4	11,2	11,8	53099	4178912
Uruguay	3,306	9403	8211	75,7	621539	8,0	11,2	9,4	10567	799894
Uzbekistan	26,167	1998	463	67,4	31188	10,0	2,2	4,7	457	30824
Venezuela	26,577	9774	6052	73,2	443040	5,9	7,1	6,5	6659	487445
Vietnam	83,105	2100	1610	73,8	118787	4,9	2,2	3,3	1450	106982
Yemen	21,096	1976	1216	61,5	74777	1,8	4,6	2,9	1066	65549
Zambia	11,478	1089	913	42,9	39153	6,3	6,3	6,3	994	42634
Zimbabwe	13,120	455	387	41,7	16156	6,7	2,2	3,8	362	15110

Table A.1. *(continue, 2)*

Country	wS	SyMW	SEMW	SyHW	SEHW	HDI (old)	HDI (new)	Life Sat	HLY	HPI
	(EF/wBC)	2005 PPP $	2005 PPP $	2005 PPP $	2005 PPP $	(0-1)	(0-1)	(0-10)	(years)	(0-100)
Albania	1,075	5915	450689	7436	566648	0,801	0,700	5,47	41,70	47,91
Algeria	1,441	5539	397117	5567	399142	0,733	0,651	5,59	40,07	51,23
Angola	2,641	3144	143066	2994	136240	0,446	0,376	4,27	17,79	26,78
Argentina	0,977	7840	586434	9972	745909	0,869	0,749	7,14	53,37	58,95
Armenia	1,665	6055	442624	7119	520420	0,775	0,669	5,03	36,08	48,28
Australia	0,307	7623	618241	10800	875895	0,962	0,925	7,88	63,73	36,64
Austria	0,482	13383	1062596	17978	1427451	0,948	0,841	7,80	61,92	47,69
Azerbaijan	1,110	1756	121850	1907	132356	0,746	0,655	5,28	35,42	41,21
Bangladesh	4,174	4162	268836	4231	273352	0,547	0,432	5,25	33,13	54,09
Belarus	0,622	4633	318270	4530	311240	0,804	0,706	5,83	40,06	35,67
Belgium	0,467	12764	1007116	17567	1386039	0,946	0,858	7,61	59,98	45,36
Benin	2,378	2599	156431	2706	162898	0,437	0,418	3,02	16,72	24,58
Bolivia	1,132	3306	213910	3975	257189	0,695	0,631	6,50	42,08	49,35
Bosnia-Herz.	0,820	4702	351686	5580	417404	0,803	0,698	5,90	43,98	44,96
Botswana	0,665	6141	312593	7690	391425	0,654	0,593	4,70	22,61	20,85
Brazil	1,018	7111	509894	8322	596705	0,800	0,678	7,57	54,30	61,01
Bulgaria	0,883	7234	525899	9567	695494	0,824	0,724	5,47	39,76	42,04
Burkina Faso	1,196	1114	58056	961	50070	0,370	0,285	3,64	18,71	22,40
Burundi	2,868	740	36323	666	32696	0,413	0,239	2,94	14,27	21,84
Cambodia	2,544	3211	190722	3171	188377	0,598	0,466	4,89	28,36	42,34
Cameroon	1,892	3062	154953	2902	146857	0,532	0,437	3,94	19,61	27,22
Canada	0,339	9523	764664	13316	1069266	0,961	0,880	7,97	63,97	39,40
Centr. Afr. R.	1,514	904	41759	827	38191	0,384	0,299	4,03	17,61	22,88
Chad	1,410	568	27549	480	23296	0,388	0,299	5,36	27,00	34,27
Chile	0,799	6856	536174	9141	714810	0,867	0,762	6,29	49,24	49,72
China	1,139	3936	285786	3709	269301	0,777	0,616	6,70	48,60	57,11
Colombia	1,340	7372	532971	8118	586899	0,791	0,658	7,33	53,00	66,10
Congo	4,416	1435	76463	1503	80101	0,548	0,470	3,65	19,71	32,43
Congo-D.Rep.	3,921	889	42322	796	37910	0,411	0,223	3,92	17,95	29,04
Costa Rica	1,056	8505	667627	10945	859207	0,846	0,708	8,50	66,72	76,12
Croatia	0,748	9529	719419	12058	910376	0,850	0,752	6,41	48,27	47,23
Cuba	1,361	9843	766788	9117	710219	0,838	n.a.	6,74	52,37	65,68
Czech R.	0,448	6913	524720	10040	762010	0,891	0,838	6,85	52,00	38,31
Denmark	0,298	8187	637739	11134	867330	0,949	0,860	8,08	62,93	35,47
Dominican R.	1,612	8320	599881	9886	712776	0,779	0,638	7,58	54,17	71,78
Ecuador	1,090	5042	376662	5904	441011	0,772	0,676	6,43	48,01	55,46
Egypt	1,440	4935	342985	4862	337887	0,708	0,587	6,68	47,20	60,32
El Salvador	1,482	6570	464487	7712	545230	0,735	0,635	6,68	47,63	61,46
Estonia	0,375	5090	368004	7211	521371	0,860	0,805	5,64	40,12	26,42
Ethiopia	1,774	958	51522	824	44353	0,406	0,287	3,98	20,61	28,10
Finland	0,457	11944	943605	16284	1286404	0,952	0,863	8,02	63,30	47,23
France	0,487	13080	1051619	17659	1419761	0,952	0,856	7,06	56,59	43,86
Georgia	2,230	7113	509265	9068	649259	0,754	0,679	4,26	30,10	43,60
Germany	0,568	15514	1231813	22166	1759973	0,935	0,878	7,18	56,78	48,07
Ghana	1,614	1664	94004	1977	111695	0,553	0,443	4,74	27,98	37,10
Greece	0,409	8715	685853	11553	909240	0,926	0,839	6,84	53,95	37,58
Guatemala	1,593	5643	392730	5603	389982	0,689	0,533	7,43	51,79	68,37
Guinea	1,887	1404	78899	1194	67107	0,456	0,323	3,98	21,81	30,25
Honduras	1,353	3953	282658	4439	317393	0,700	0,579	7,02	48,74	60,99
Hungary	0,676	9057	660224	12720	927308	0,874	0,798	5,73	41,80	38,86
India	2,683	5189	325363	5528	346578	0,619	0,482	5,51	35,11	53,03
Indonesia	2,529	5461	380655	5854	407995	0,728	0,561	5,67	39,52	58,92
Iran	0,896	4496	317392	4332	305830	0,759	0,660	5,63	39,55	42,08
Iraq	1,845	985	67500	932	63815	n.a.	n.a.	5,35	30,89	42,59
Ireland	0,383	11094	875282	15547	1226662	0,959	0,886	8,14	63,85	42,62
Israel	0,495	9876	793076	13451	1080149	0,932	0,861	7,08	56,84	44,49
Italy	0,504	11870	959093	15619	1261976	0,941	0,838	6,93	55,66	44,02
Jamaica	2,206	12625	900161	15779	1125033	0,736	0,676	6,72	48,52	70,09
Japan	0,490	12045	992529	16456	1355967	0,953	0,873	6,75	55,57	43,25
Jordan	1,406	5543	398540	6147	441946	0,773	0,652	5,99	43,05	54,59
Kazakhstan	0,711	2692	174410	2918	189114	0,794	0,696	6,13	40,39	38,54
Kenya	2,248	2708	142182	3098	162665	0,521	0,443	3,67	19,13	27,77
Korea (South)	0,641	12523	984306	17109	1344733	0,921	0,851	6,31	49,12	44,43
Kuwait	0,270	7359	568870	7754	599355	0,891	0,764	6,67	51,56	27,04
Kyrgyzstan	2,188	3152	211481	3362	225566	0,696	0,572	4,98	32,66	47,09
Laos	2,271	3377	214766	2990	190163	0,601	0,460	6,24	39,42	57,34
Latvia	0,687	7137	511737	9530	683308	0,855	0,763	5,43	39,11	36,67
Lithuania	0,749	8887	638120	11772	845219	0,862	0,775	5,76	41,78	40,90
Macedonia	0,521	3488	257420	4118	303884	0,801	0,678	5,49	40,52	32,66
Madagascar	2,218	1655	97476	1815	106908	0,533	0,420	3,73	21,80	31,54
Malawi	5,089	3012	153889	2965	151524	0,437	0,336	4,44	20,56	34,47
Malaysia	0,991	8156	601089	9485	699063	0,811	0,726	6,60	48,63	54,05
Mali	1,481	1304	61822	1184	56102	0,380	0,279	3,76	19,98	25,77

Table A.1. *(continue, 3)*

Country	wS (EF/wBC)	SyMW 2005 PPP $	SEMW 2005 PPP $	SyHW 2005 PPP $	SEHW 2005 PPP $	HDI (old) (0-1)	HDI (new) (0-1)	Life Sat (0-10)	HLY (years)	HPI (0-100)
Mauritania	1,261	1625	91649	1492	84130	0,550	0,411	4,95	31,30	38,21
Mexico	0,709	7095	535643	8788	663458	0,829	0,727	7,72	58,33	55,58
Moldova	1,946	4282	290741	5165	350702	0,708	0,606	5,65	38,66	54,08
Mongolia	0,686	1375	90052	1717	112460	0,700	0,588	5,66	37,30	34,95
Morocco	2,122	6731	473893	6626	466450	0,646	0,536	5,63	39,67	56,75
Mozambique	2,573	1429	68155	1244	59331	0,384	0,263	3,84	16,44	24,61
Myanmar	2,165	1977	119777	1646	99760	0,583	0,406	5,86	35,63	51,23
Namibia	0,647	2976	174367	3524	206523	0,650	0,577	4,50	23,22	21,10
Nepal	3,146	2751	179650	2523	164772	0,534	0,400	5,32	33,31	51,91
Netherlands	0,546	16015	1271592	22244	1766192	0,953	0,877	7,71	61,05	50,60
New Zealand	0,312	6214	495856	8878	708463	0,943	0,896	7,81	62,33	36,21
Nicaragua	1,170	2386	171528	2607	187461	0,710	0,545	7,09	50,98	60,54
Niger	1,466	815	40515	731	36316	0,374	0,241	3,75	20,95	26,94
Nigeria	1,788	1791	84697	1873	88595	0,470	0,402	4,78	22,21	30,35
Norway	0,347	11723	937875	16889	1351091	0,968	0,932	8,09	64,57	40,36
Pakistan	2,911	5559	364661	5310	348319	0,551	0,468	5,60	36,19	55,56
Panama	0,751	5893	443121	7657	575816	0,812	0,724	7,79	58,53	57,37
Paraguay	0,745	2592	184829	3010	214583	0,755	0,619	6,87	48,95	47,80
Peru	1,531	7825	567296	9827	712486	0,773	0,695	5,90	41,71	54,37
Philippines	2,758	7736	550036	9499	675356	0,771	0,619	5,47	38,86	59,02
Poland	0,606	6907	519407	9302	699499	0,870	0,775	6,48	48,72	42,75
Portugal	0,541	9450	738999	11875	928648	0,897	0,775	5,85	45,46	37,46
Romania	0,836	6594	474777	8458	608988	0,813	0,733	5,92	42,58	43,89
Russian Fed.	0,640	4887	320071	5162	338119	0,802	0,693	5,87	38,13	34,47
Rwanda	3,024	2102	101742	1893	91613	0,452	0,334	4,23	19,13	29,59
Saudi Arabia	0,914	9966	719529	8893	642061	0,812	0,732	7,70	55,63	59,70
Senegal	1,767	2359	129494	2421	132890	0,499	0,388	4,48	27,93	38,03
Serbia	0,923	6592	485196	8319	612311	n.a.	0,719	6,00	44,19	47,63
Sierra Leone	3,107	1579	73272	1523	70659	0,336	0,292	3,55	14,84	23,08
Singapore	0,576	20732	1650260	23043	1834237	0,922	0,826	7,12	56,50	48,24
Slovakia	0,729	10123	751115	14249	1057277	0,863	0,796	6,07	45,05	43,52
Slovenia	0,538	10848	840695	14311	1109141	0,917	0,813	7,00	54,22	44,53
South Africa	1,152	8111	420162	10173	526956	0,674	0,587	4,95	25,15	29,69
Spain	0,418	9478	761058	12796	1027482	0,949	0,848	7,60	61,20	43,19
Sri Lanka	2,342	7746	570865	9217	679313	0,743	0,635	5,39	38,59	56,55
Sudan	0,984	1187	68039	972	55686	0,526	0,360	4,49	25,77	28,55
Sweden	0,470	13582	1093333	19159	1542332	0,956	0,883	7,85	63,22	47,99
Switzerland	0,480	15673	1274253	21264	1728794	0,955	0,870	7,69	62,55	48,05
Syrian Arab R.	1,154	2944	216676	2521	185541	0,724	0,576	5,90	43,45	51,32
Tajikistan	3,407	4389	287942	4751	311662	0,673	0,550	5,10	33,83	53,48
Tanzania	2,095	1983	106501	2103	112955	0,467	0,370	2,45	12,48	17,79
Thailand	1,126	6352	434495	7270	497236	0,781	0,631	6,25	43,51	50,90
Togo	2,920	1904	116878	1834	112634	0,512	0,414	2,62	15,15	23,28
Trini. and Tob.	1,126	9577	657906	11658	800902	0,814	0,713	6,69	46,33	54,21
Tunisia	1,361	7085	520745	6980	513004	0,766	0,650	5,89	43,31	54,31
Turkey	0,884	8287	591658	9335	666496	0,775	0,656	5,52	39,42	41,70
Uganda	1,744	1341	67443	1339	67356	0,505	0,380	4,48	22,27	30,21
Ukraine	0,890	3887	263905	4860	330002	0,788	0,696	5,30	35,89	38,07
United King.	0,450	13051	1031040	17309	1367446	0,946	0,845	7,42	58,60	43,31
United States	0,255	9441	743034	13518	1063830	0,951	0,895	7,85	61,17	30,73
Uruguay	0,438	3595	272169	4627	350269	0,852	0,733	6,75	51,24	37,24
Uzbekistan	1,323	612	41274	605	40792	0,702	0,588	6,04	40,32	50,07
Venezuela	0,853	5165	378060	5682	415952	0,792	0,666	6,89	50,43	52,49
Viet Nam	1,902	3061	225927	2757	203475	0,733	0,540	6,49	47,85	66,52
Yemen	2,629	3196	196573	2802	172314	0,508	0,403	5,20	31,98	48,09
Zambia	3,114	2842	121933	3095	132773	0,434	0,360	4,31	17,47	27,18
Zimbabwe	2,145	831	34661	777	32418	0,513	0,159	2,83	11,56	16,59

Note: all data are per capita. Total cases: 130. Total population: 6,280,425.
Sources: see the text in the Appendix.

Table A.2. *Summary statistics: weighted averages of selected indices, and tradeoffs*

	Population-weighted world average	Tradeoffs (1)
Improved GNI (MWI) (1)	7740,00	1
Life Expectancy (BWI) (2)	68,47	113
Mean Years of schooling (3)	6,64	1167
Freedom rates (4)	4,14	1871
Biocapacity (5)	1,72	4490
Ecological footprint (6)	2,40	3227

(1) international PPP 2005 $; (2), (3) years; (4) freedom rates (from 1, lowest; to 7, highest); (5) global hectares per capita.
Sources: elaborations from table A.1.

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