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The WELLBY: a new measure of social value and progress

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We introduce the WELLBY, a new measure of social value and progress, which can contribute to the assessment of progress towards the wellbeing of the economy and steer towards activities with the most wellbeing per financial resources invested. After providing a short rationale for the WELLBY, we give a definition and an overview of its properties. We then show how WELLBYs can help decision-makers with ex-ante policy appraisals and deliver a practical example of a youth traineeship programme. We also discuss how coefficients from ex-post wellbeing policy evaluations are now being collected as part of social value banks around the world, feeding into future appraisals. Finally, we illustrate how WELLBYs can be used to measure social progress overall, going beyond GDP.

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Introduction

The wellbeing of citizens, employees, and customers has long been a recognised goal, amongst others, of governments, employers, and businesses (Sustainable Prosperity, 2023). As a notable example, the *World Happiness Report*, published annually by the United Nations Sustainable Development Solutions Network (UN SDSN), has documented the progress of governments around the world since 2012 in improving the wellbeing of their citizens, where wellbeing is mainly understood as citizens' self-reported life evaluation (measured by Cantril's life ladder; Cantril, 1964), provided by the Gallup World Poll. Moreover, employers have used measures of job satisfaction and happiness for decades as a key indicator of the wellbeing of employees, predictive of customer satisfaction, job retention, and productivity more generally (De Neve and Oswald, 2012; Oswald et al., 2015; Krekel et al., 2019). Finally, some businesses, such as those in the *Wellbeing Economy Alliance*, have adopted the 'wellbeing economy' as their stated goal, consisting of five sub-goals: fairness, participation, dignity, purpose, and nature.

In this paper, we introduce the *WELLBY (Wellbeing-Year)*, a new measure of social value and progress, which can contribute to the assessment of progress towards the wellbeing of the economy and steer towards activities with the most wellbeing per financial resources invested. It is especially useful when it comes to large, complex policy initiatives as it allows for quick, ball-park calculations involving changes in many areas. The WELLBY is defined as one point of self-reported life satisfaction measured on a 0-to-10 Likert scale for one individual for one year. From this basic unit of individual measurement, one can derive more particular measures of national, international, and intergenerational value. The resulting effect of any policy initiative, as viewed from a national lens, is thus the change in the total amount of WELLBYs enjoyed by the target population, which combines both quality of life and length of life in a single metric. WELLBYs can be monetised and enter social cost-benefit analyses (CBA) alongside other monetary benefits captured by willingness-to-pay, or they can be used standalone as the ultimate measure of benefit in social cost-effectiveness analyses (CEA). WELLBYs help us go beyond GDP by providing an alternative—more encompassing—measure of social progress and the 'wellbeing wealth' of a nation.

As an anthropocentric measure, the importance of the far future in the WELLBY is embedded in the importance of the wellbeing of the human population in the far future, when employing a social discount rate: the lower the social discount rate, the more the far future counts and hence any effects of changes in the environment and nature as the support structures for those populations whose wellbeing counts. The discounted WELLBYs of the human population is our proposed metric not just for today but also for the far future.

The term *WELLBY* was coined by Frijters et al. (2020) and has by now officially been adopted by HM Treasury in the UK and the New Zealand Treasury as a policy analysis tool for both ex-ante appraisals and ex-post evaluations of public policies. Lists of policy effects of this new measure—so-called *social value banks*—are now being set up or developed in the UK, Denmark, Canada, and the US, and are gaining interest in other countries as well. These values are based on best-available evidence, sometimes policy experiments or ex-post policy evaluations. They feed into future ex-ante appraisals, closing the wellbeing policy analysis cycle. Importantly, the use of WELLBYs is not constrained to public policy: they can be a helpful tool to measure the impacts of private and third-sector organisations too, for instance as part of their Environmental, Social, and Governance (ESG) efforts.

The major reason for the adoption of the WELLBY by governments is that its simplicity allows politicians and populations to easily understand it: its one-dimensionality permits

transparent calculations wherein it is clear to the analyst what is assumed about the theory of change and causality, something that is nearly impossible with alternative, high-dimensional measures such as wellbeing indices. Another major advantage is the number of scientific studies informing us about the determinants of life satisfaction—well above 100,000—meaning that there is a huge literature to draw upon. Moreover, there is by now a large and increasing list of policies that have been evaluated from around the world, allowing for comparisons and ball-park assessments.

Importantly, adopting the WELLBY (and a wellbeing orientation more generally) is in the self-interest of governments and businesses, as wellbeing has been shown to be a stronger predictor of voting for the incumbent than economic factors (Liberini et al., 2017; Ward, 2019), and wellbeing is associated with firm profitability, where companies that have the highest levels of wellbeing have been found to subsequently outperform standard benchmarks in the stock market (De Neve et al., 2023).

Below, we reproduce Fig. 1 in the 2021 *Handbook for Wellbeing Policy-Making* (Frijters and Krekel, 2021), which shows the cost-per-WELLBY (in GBP) of 15 different policy initiatives from around the world, going from highly cost-effective (in producing 1.0 WELLBYs) on the left to less cost-effective on the right. Note that its scale is logarithmic, meaning that vertical space translates to GBP proportionally.

Figure 1 includes UK interventions, such as the *Improving Access to Psychological Therapies (IAPT)* programme (recently renamed to *NHS Talking Therapies for Anxiety and Depression*), a nationwide mental health service to treat depression and anxiety disorders within the National Health Service (NHS), or the 2012 London Olympics (Dolan et al., 2019); Pakistani interventions amongst rural villagers (also to treat common mental health problems); German interventions (to abate air pollution); Australian interventions (the training of employee problem-solving skills); US interventions (a work-life balance intervention); and Canadian interventions ('*Housing First*', Stergiopoulos et al., 2015). The most cost-effective intervention is IAPT, which is estimated to save more money for the government than it costs, and thus has a negative cost-per-WELLBY. The least cost-effective is Housing First, a large Canadian randomised controlled trial that provides the homeless with a house and which turned out to have near-zero effects on their mental wellbeing whilst making addiction problems worse for neighbours and government services.

What allows this large breadth of programmes to be evaluated in terms of cost-per-WELLBY is the ubiquitous inclusion of a life-satisfaction question in many surveys researchers around the world. Of course, each of these numbers can be challenged (indeed, we encourage researchers to do so), e.g. the cost-per-WELLBY may vary depending on context, which raises the important point of what kind of process would be in charge of maintaining currently believed mainstream numbers—an issue very similar to that on climate. That is, there needs to be a list of currently believed numbers that policy analysts can go to for their policy appraisals as well as a transparent process by which the scientific community can challenge these numbers and update them.

Besides being useful to appraise and evaluate large policy initiatives, the WELLBY as an outcome has also proven to be simple and cheap enough to be used by small businesses and charities.¹ The *State of Life* non-profit (State of Life, 2023), for instance, has provided free tools to a large number of small organisations (including some in the developing world) to allow them to quickly estimate the WELLBY effects of their experiments on local groups of clients and beneficiaries, like

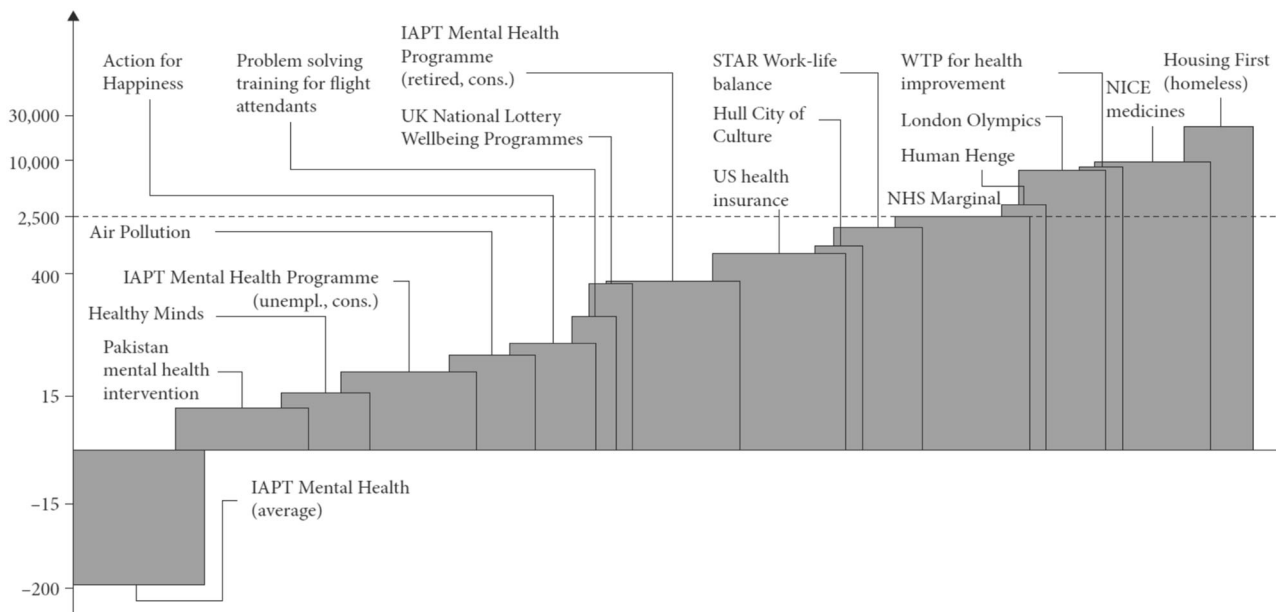


Fig. 1 Cost-per-WELLBY of 15 policy initiatives. Costs are in GBP. The dashed line ('NHS Marginal') shows the minimum social production cost of 1.0 WELLBYs derived from the minimum social production cost estimated to produce 1.0 QALYs (Quality-Adjusted Life-Years) (Claxton et al., 2015). The scale is logarithmic, meaning that vertical space translates to GBP proportionally. Source: Frijters and Krekel (2021).

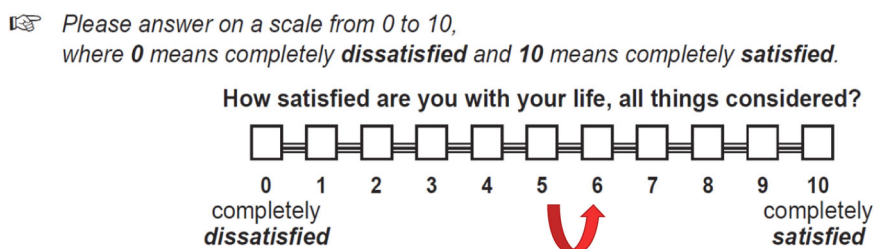


Fig. 2 1.0 WELLBYs. The red arrow is equivalent to 1.0 WELLBYs. Source: German Socio-Economic Panel Study (SOEP).

participants in local sports clubs or churches. Users send a list of clients and beneficiaries simple standard questionnaires before and after some small intervention (like a new activity or training exercise), which can then be compared with a quasi-experimental control group, with standard software then generating graphs of changes and cost-benefit outcomes.

In the remainder of this paper, we provide a detailed definition of the WELLBY and an overview of its properties. We then show how WELLBYs can be used to allocate scarce resources to areas that generate the most wellbeing, in the form of ex-ante policy appraisals, and give a practical example of a youth traineeship programme. Here, we draw mostly on our experience from the UK, which has now included the WELLBY in the official guidelines for policy appraisal and evaluation by HM Treasury. We also show how coefficients from ex-post wellbeing policy evaluations are now being collected as part of social value banks around the world, feeding into future appraisals. Finally, we illustrate how WELLBYs can measure social progress overall, going beyond GDP.

Definition and properties

In various social science surveys conducted nationally and internationally since the 1970s, questions about life satisfaction have been included. In the UK, such surveys include the British Household Panel Survey/UK Household Longitudinal Survey, known as “Understanding Society”, conducted annually since

1991. Importantly, based on recommendations by Dolan and Metcalfe (2012), the Office for National Statistics (ONS) in the UK has included a life-satisfaction question, along with other wellbeing questions such as happiness, anxiety, and a sense of worthwhileness in life (indicative of eudemonia), in all its surveys since 2011. This practice also extends to other large-scale UK surveys, such as the Labour Force Survey/Annual Population Survey (APS), which samples over 320,000 individuals per year (ONS, 2018). WELLBYs build on this breadth of data.

A *WELLBY (Wellbeing-Year)* is defined as one point of self-reported life satisfaction measured on a 0-to-10 Likert scale for one individual for one year (Frijters et al., 2020; Frijters and Krekel, 2021). It is typically measured using annual surveys, as shown in Fig. 2 (the red arrow is equivalent to 1.0 WELLBYs):

Using individuals’ self-reports of their overall life satisfaction—a global, evaluative measure of subjective wellbeing—as the foundational measure of the WELLBY comes with several advantages. First, and foremost, allowing individuals to directly assess their own quality of life is inherently democratic, in the sense that it is left up to individuals to judge for themselves the quality of their lives, just as voting carries the principle that judgments are ultimately made by individuals for their personal reasons (Frijters and Krekel, 2021). Interestingly, empirical evidence from vignette studies indicates that individuals themselves perceive life satisfaction as a key, overarching life outcome (Adler et al., 2017, 2022). Maximising life satisfaction also aligns with observed behaviour in choice experiments (Benjamin et al., 2012).

The measure correlates well with objective outcomes like health and longevity (Danner et al., 2001; Steptoe and Wardle, 2011; Steptoe et al., 2015), productivity (De Neve and Oswald, 2012; Oswald et al., 2015; Krekel et al., 2019), and it predicts individual behaviours such as voting patterns (Liberini et al. 2017; Ward, 2019) or ‘get-me-out-of-here’ actions (Kaiser and Oswald, 2022).

Many behavioural phenomena are captured via life satisfaction and can thus be integrated into social welfare analyses. This includes anticipation and misprediction (Odermatt and Stutzer, 2019), adaptation to changing life circumstances (Clark et al., 2008), relative comparisons and status concerns (Luttmer, 2005; Card et al., 2012; Perez-Truglia, 2020), wellbeing spillovers between individuals (Mervin and Frijters, 2014), and procedural utility elements such as fair treatment, dignity, or how people generally feel they are treated, which can be as crucial as the intended outcome of a policy. Life-satisfaction data collection and analysis is also quite cheap: it is easy to collect, interpret, and straightforward to analyse. A substantial and readily available evidence base on what matters (or not) to people’s lives exists, both in the UK and elsewhere (cf. Clark et al., 2018), and it continues to expand.

Questions about life satisfaction, such as our single-item Likert scale above or Cantril’s life ladder (Cantril, 1964), have been shown to have robust psychological characteristics, including reliability, validity, sensitivity, and discriminant validity (Diener et al., 2013). That is, life-satisfaction scores have been found to be *stable* (scores are similar under similar conditions such as different stages of the life course, cf. Diener and Diener, 1995; Michalos and Kahlke, 2010) and *convergent* (different life-satisfaction questions such as the *Satisfaction With Life Scale* by Diener et al. (1985) and Cantril’s life ladder converge, cf. Diener et al., 1985; Eid and Diener, 2004; Inglehart and Welzel, 2010); *valid* (scores are thoughtful and reasonable, cf. Urry et al., 2004; Steptoe et al., 2005; Giuntella et al., 2022; Frijters et al., 2023); *sensitive* (scores are malleable to changing conditions over time, cf. Schimmack and Oishi, 2005; Lucas and Donnellan, 2007); and have *discriminant validity* (scores do not perfectly correlate with those of measures for other concepts and have somewhat different correlations with external variables, see the differences between life satisfaction, experiences of happiness, and income (cf. Kahneman and Deaton, 2010; Killingsworth, 2021; Killingsworth et al., 2023). Hence, answers to the life-satisfaction question provide meaningful information across different stages of the life course, across different contexts, and over time, though there are notable individual differences (e.g. personality, values, and culture may moderate contextual influences on someone’s life satisfaction, cf. Diener and Lucas, 1999; Sortheix and Schwartz, 2017; Uchida et al., 2004), underlining the importance of randomised trials in policy analysis.² Certainly, while our measure of life satisfaction has important advantages, it is not without limitations. Intra-personal variability in life satisfaction is substantial, which makes it necessary to collect a large number of observations, ideally longitudinally, from the same individuals over time. Moreover, the measure is susceptible to item-ordering effects and priming, as demonstrated by preceding items in surveys (cf. Schimmack and Oishi, 2005), along with survey-framing effects,

interviewer and mode effects (cf. Dolan and Kavetsos, 2016), and sensitive to incidental contextual factors such as weather conditions (cf. Schwarz and Clore, 1983). If one wants to compare outcomes across time and survey designs, one has to pay close attention to how different surveys were conducted and, if necessary, empirically adjust for differences (e.g. in survey mode). More generally, WELLBYs are captured via surveys, and surveys have difficulties in achieving representative samples and high response rates at any point in time as well as over time, which is necessary to obtain unbiased data for policy monitoring purposes and which can be challenging.

When it comes to interpretation, studies into respondents’ introspection about life domains, time horizons, and social circles reveal that our measure of life satisfaction does not neatly align with standard notions of utility in economics, such as self-regarding flow, forward-looking, or life-time utility (Benjamin et al., 2021). It corresponds more with the story humans tell about their lives than some notion of ‘life as it was experienced at the time’. Lastly, although arguments based on logic (Layard and De Neve, 2023), joint language use (Kapteyn, 1977), test–retest reliabilities (Krueger and Schkade, 2008; Prati and Senik, 2022), cross-rater validities (Sandvik et al., 1993; Schneider and Schimmack, 2009), or different modelling approaches (Frey and Stutzer, 2000; Frijters and Ferrer-i-Carbonell, 2004) suggest that respondents treat life-satisfaction responses as cardinal, there exists no (known) method for being certain about cardinality in the absence of a measure one does consider infallible.

Finally, WELLBYs (which are based on global, cognitive evaluations of individuals’ lives relative to their ideal lives) may be too coarse to capture smaller, often short-term and one-off daily activities (such as going to a museum, doing sports, or being stuck in traffic), which may be equally important for policy and welfare. Here, WELLBYs can be complemented with alternative measures of subjective wellbeing. For example, Krekel and MacKerron (2023), for the first time, exploit individuals’ momentary experiences of happiness to estimate the monetary value of time (VOT) spent in 41 daily activities, a method they refer to as *experiential valuation*, which can be used to monetise such activities in CBA alongside monetised WELLBYs.³

WELLBYs can come in different flavours, depending on their purpose (e.g. whether they are used for ex-ante policy appraisal or for measuring social progress). A few important versions and their purposes are listed in Table 1.

It is worth noting for policy-makers interested in using the WELLBY that, as life satisfaction has been shown to vary over the life course (cf. Blanchflower, 2020), the age-standardised WELLBY may be most suitable for monitoring purposes.

The WELLBY as a measure of social value

Conceptual frameworks. In the UK, the official guidelines for policy appraisal and evaluation—HM Treasury’s *Green Book*—now allow using WELLBYs for policy analysis, in both ex-ante policy appraisals, where they may enter as a measure of benefit, and ex-post policy evaluations, where they may be included as an outcome (to feed into future appraisals). So, UK government

Table 1 Different versions of WELLBYs and their purpose.

Version of WELLBY	Purpose
Crude WELLBY	Useful for ex-ante policy appraisals or ex-post policy evaluations; CBA and CEA
Age-standardised WELLBY	Useful for comparisons between populations and/or over time
Expected lifetime WELLBY	Useful for comparisons between populations and/or over time
Relative and absolute inequality measures of WELLBY	Useful for calculating gradients and differences/inequalities between groups

departments and agencies can now argue for higher budgets if they can show their (intended) activities generate WELLBYs.

WELLBYs can enter ex-ante policy appraisals either as crude WELLBYs in CEA (when all benefits can be expressed in WELLBYs) or monetised in CBA, alongside other monetary benefits captured by willingness-to-pay (HM Treasury, 2022). WELLBYs are compatible with these standard tools of public policy appraisal, though also useful beyond government.

In CEA, we select the policy that yields the lowest social unit cost (SUC) amongst all policy options, according to Eq. (1):

$$SUC = \frac{\sum_{t=0}^T \frac{1}{(1+r)^t} \sum_{i=1}^N (C_{it}^1 - C_{it}^0)}{\sum_{t=0}^T \frac{1}{(1+\rho)^t} \sum_{i=1}^N (W_{it}^1 - W_{it}^0)} \quad (1)$$

where W are WELLBYs; C are net public costs (i.e. public costs less savings); t and T denote the year and the number of years of the policy to be appraised; i and N denote the individual and the number of individuals affected by the policy; and r and ρ are the financial discount rate and the WELLBY discount rate, respectively.

When it comes to sustainability, in our perspective, future generations can (should) be included in the stream of WELLBYs over time. In Eq. 1, a policy-maker could look at a large time horizon T and adopt a small (or even zero) WELLBY discount rate ρ , such that future generations are given more consideration (or even just as much weight as the current generation). This would, of course, require us to have estimates of ecological change on both life satisfaction and life expectancy. We acknowledge, however, that there may be different perspectives. An alternative approach, which may be more palatable to policy-makers who see the WELLBY as a measure besides GDP, would be to include the social cost of carbon as a net public cost in the numerator of Eq. 1. Yet another approach, perhaps most palatable to those who argue for dashboards of measures, would be to use the WELLBY as one measure amongst many for policy appraisal when it comes to issues of sustainability and future generations.

Typically, however, in the UK, analysts assume a financial discount rate of 3.5%, in line with long-term HM Treasury bond rates. The WELLBY discount rate is assumed to be lower: 1.5%, in line with the discount rate used for health.⁴ Note that the superscripts 1 and 0 denote the treatment and control group, respectively, suggesting that presumed benefits and costs should, ideally, come from (causal and robust) changes relative to the status quo (e.g. a randomised controlled trial).

A social planner who wants to maximise wellbeing in society maximises total WELLBYs subject to the budget constraint.⁵ In practice, this can be done by ranking all policy options in CEA from the lowest to the highest SUC (as shown in Fig. 1), and then implement all policies until the budget runs out. The SUC of the last policy implemented then yields the shadow price of wellbeing in society, i.e. the minimum social production costs of 1.0 WELLBYs (Frijters and Krekel, 2021). Note that, for policy appraisal, we adopt a democratic, societal perspective (i.e. the wellbeing of the demos). Pragmatism often forces governments and their bureaucracies to ignore most spillovers, though it is precisely one of the strengths of the WELLBY that at least some spillovers (like effects within the population and because of status or environmental concerns) are counted in the WELLBY. Because environmental damage like air or noise pollution has a clearly demonstrated wellbeing effect, externalities on that issue are automatically counted, whereas they are not in traditional willingness-to-pay measures.

Different from CEA, CBA tells us whether the social or public value of a policy is positive or negative, including how large it is, and the resulting benefit-cost ratio. The decision environment one then has in mind is not that one can do several things with a finite budget and thus goes down a list of cost-effectiveness, but

rather one only has the organisational resources to do one thing. In this case, one selects the policy that yields the highest (positive) net present social value (NPSV) according to Eq. (2), or the largest benefit–cost ratio (BCR):

$$NPSV = NPV_B - NPV_C = \sum_{i=0}^T \frac{\sum_{i=1}^N (B_{it}^1 - B_{it}^0)}{(1+r)^t} - \sum_{i=0}^T \frac{\sum_{i=1}^N (C_{it}^1 - C_{it}^0)}{(1+r)^t} \quad (2)$$

where NPV is the net present value; B are benefits (monetised WELLBYs alongside other monetary benefits obtained from estimating the willingness-to-pay using either stated or revealed preferences); and the remainder is as before.

How much is 1.0 WELLBYs worth? In the UK, 1.0 WELLBYs is currently valued between GBP 10,000 (lower bound) and GBP 16,000 (upper bound), with a proposed central value of GBP 13,000, all in 2019 prices (HM Treasury, 2021). The lower bound is inspired by Frijters and Krekel (2021) and is obtained by pegging the WELLBY to the monetary value of a Quality-Adjusted Life-Year (QALY), i.e. a year of full mental and physical health, an established measure in health economics, which UK Government values at GBP 70,000 (likewise in 2019 prices). As full health is associated with a life-satisfaction score of 8 on a 0-to-10 Likert scale, and individuals who tend to be indifferent between life and death report a life-satisfaction score between 1 and 2, the lower bound can be calculated as GBP 70,000/(8–1) = GBP 10,000 (taking here a score of 1 as being indifferent between life and death, cf. HM Treasury, 2021).⁶ The upper bound is inspired by Fujiwara (2021) and is obtained by calculating the marginal rate of substitution between life satisfaction and income (using a coefficient of 1.96 for log income and average earnings of GBP 30,673 in the UK in 2019).

Take the following simplified example: some policy X has a (causal) effect on life satisfaction, measured on a 0-to-10 Likert scale, of 0.15 points and lasts for exactly one year. This policy has a cost of GBP 500 per person, likewise for exactly one year. We can monetarily value the wellbeing benefit using the proposed central value of 1.0 WELLBYs. Hence, it is worth 0.15 × GBP 13,000 = GBP 1950 per person. In CBA, we have a net benefit of GBP 1950 – GBP 500 = GBP 1450 per person, or a benefit–cost ratio of GBP 1950/GBP 500 = 3.9. In CEA, we have a social unit cost (or cost-per-WELLBY) of GBP 500/0.15 = GBP 3333, which can then be compared in terms of cost-effectiveness to alternative policies (like those in Fig. 1). Of course, in practice, net benefits, benefit–cost ratios, or social unit costs are not the only criteria for decision-making. For example, consideration needs to be made regarding (i) actual resources available, (ii) opportunity costs, (iii) implementation costs and fixed costs of disinvestment (which should be included as public costs), (iv) democracy and public consent for change, (v) inequality, (vi) sustainability (ecological, financial, and social), and (vii) overall policy strategy. In particular, when it comes to inequality, policy-makers should pay close attention to inequality gradients across population groups ranked by social and economic characteristics, in addition to looking at average impacts and total WELLBYs. Nevertheless, CBA and CEA give decision-makers an important tool for how to think about social or public value. Note that, while we implicitly assumed a Utilitarian social welfare function, WELLBYs are compatible with other social welfare functions too, such as the Prioritarian family of social welfare functions.

When it comes to social welfare overall, on average, a typical UK resident generates 533 WELLBYs over her lifetime, i.e. a mean life satisfaction surplus of 6.5 (which is the mean life satisfaction of 7.5 in the UK minus the level of 1 considered equal to death) times a mean life expectancy of 82 years in the UK in

2022. With 67 million residents, the UK generated about 35.7 billion WELLBYs in 2022.

A practical example. Take a fictitious youth traineeship programme inspired by a real-life policy implemented in Wales (cf. Frijters and Krekel, 2021, Chapter 5), which is similar to many active labour market policies targeting youth today, to be appraised over a five-year period.

Assume that this traineeship programme targets 50,000 individuals aged 17–20 who have NEET status (‘Neither in Employment, Education, or Training’) and that take-up is 50%. The training is one day per week for 52 weeks (1 year). It is a multi-component intervention that has three active ingredients: (i) volunteering in the local community, (ii) socio-emotional skills training (i.e. growth mindset; goal-setting and planning techniques), and (iii) job search training.

In terms of benefits, volunteering in the local community generates +0.20 points of life satisfaction measured on a 0-to-10 Likert scale (+0.20 WELLBYs) in year 1 (cf. Dolan et al., 2021), the socio-emotional skills training is assumed to generate +0.10 WELLBYs in years 1–5, being employed generates +0.46 WELLBYs in years 2–5 (cf. Clark et al., 2018), and income from employment is GBP 18,000 in years 2–5. In terms of costs, the programme costs GBP 10,000 per trainee in year 1 and has a one-off implementation cost of GBP 100,000 in year 0.

Should we implement this policy? Conventional policy appraisal based on willingness-to-pay would answer this question using only income from employment as a measure of benefit, neglecting the wellbeing benefits of volunteering, better socio-emotional skills, and, most importantly, the psychological cost of being unemployed (or, conversely, the psychological benefit of gaining employment). WELLBYs, however, provide a holistic measure of benefit that can capture *all* of these benefits, not only income.⁷

Table 2 shows the results from our CEA based on Eq. 1 (Appendix Table A1 shows our initial assumptions and Table A2 the results from a CBA based on Eq. (2), which yields a similar recommendation as our CEA).

We find that the youth traineeship programme has a social unit cost of GBP 2957, which can now be compared to alternative programmes. A prudent policy-maker who wants to increase

wellbeing in society would select the programme that yields the lowest unit cost. If there are no other programmes to compare to, a natural comparison is the monetary value of 1.0 WELLBYs, which is GBP 13,000 (i.e. the proposed central value). As the social unit cost of the programme is (much) lower than this value, our ex-ante policy appraisal suggests that the programme is relatively cost-effective and should be implemented.

Of course, after being implemented, the programme should be evaluated ex-post—ideally using a randomised controlled trial—to examine whether the presumed wellbeing benefits (and net costs) actually accrued. The findings of this ex-post policy evaluation can then feed into the evidence base of policies and programmes held by governments, and in particular, social value banks that carry WELLBY coefficients for future policy appraisals. These can then feed into future ex-ante policy appraisals. As it turns out, such social value banks are currently in development in the UK and elsewhere.

Social value banks. Various social value banks based on the WELLBY already exist in the UK and are described in detail elsewhere (HM Treasury, 2021, pp. 61–70; Simerica-Jacobs, 2022). In what follows, we outline three *new* WELLBY social value banks that are currently being developed in other countries around the world, specifically Denmark, Canada, and the US, to put the WELLBY into policy practice globally. We note that our exposition is not exhaustive.

In Denmark, the *Open Social Value Bank (OSVB)* is being developed for the use of social values in Denmark and the Nordic countries. The OSVB is a development project and intersectoral partnership between the University of Copenhagen (academia), Ramboll Management Consulting (the private sector), Economists Without Borders (an NGO), and Impactly Aps (a tech company). The ‘open’ in Open Social Value Bank refers to (i) OSVB being a collaborative project that involves both public and private actors that have an interest in subjective wellbeing valuation; (ii) that the OSVB methodology is transparent; and (iii) that OSVB social values are open to the public. The OSVB has a board, a steering group, and an advisory board. Since its inception, the OSVB has established a Danish WELLBY monetary value based on a conversion of the Danish Ministry of Finance’s value of a life year (VOLY), which is based on the value of a

Table 2 Youth traineeship programme—CEA using WELLBYs.

Social cost-effectiveness analysis (CEA)

Benefits							
Discount factor	1.00	0.99	0.97	0.96	0.94	0.93	
Year	0	1	2	3	4	5	Total
WELLBYs per trainee		0.30	0.56	0.56	0.56	0.56	
Income per trainee in GBP			18,000	18,000	18,000	18,000	
Income per trainee in WELLBYs			0.22	0.22	0.22	0.22	
Total WELLBYs		7500	19,573	19,573	19,573	19,573	
PV benefits: Discounted total WELLBYs		7389	18,999	18,718	18,441	18,169	81,715
Net costs (Costs–Savings)							
Discount factor	1.00	0.97	0.93	0.90	0.87	0.84	
Year	0	1	2	3	4	5	Total
Costs per trainee		10,000					
Savings per trainee							
Net costs per trainee		10,000					
Total net costs			250,000,000				
One-off costs	100,000						
PV net costs: Discounted total net costs	100,000	241,545,894					241,645,894
SUC (“Social Unit Cost”): PV net costs/PV benefits							2957
<i>Recommendation: Implement Policy (SUC < 13,000)</i>							

Source: Own calculations.

statistical life (VSL) (Finansministeriet, 2021). Contrary to the UK, the Danish government does not have an official monetary value for a QALY. However, according to UK Government documentation (cf. HSE, 2020), a VOLY and a QALY can be valued equally, so one VOLY corresponds to one QALY. Hence, the OSVB has established a WELLBY monetary value based on the UK Green Book conversion from QALY (and by extension, VOLY) to WELLBY (HM Treasury, 2021), thereby arriving at a Danish WELLBY monetary value—the method originally proposed by Frijters and Krekel (2021). This value is currently in use, and will also undergo future revisions in terms of its suitability and validity. Studies using Danish register and survey data, as well as discrete choice experiments, are planned for the purpose of revising or validating the Danish WELLBY.

In the first phase of the project, OSVB has adopted coefficients from the HACT UK social value bank (Simetrica-Jacobs, 2022), and preliminary Danish social values are based on UK WELLBY coefficients but monetised using the Danish WELLBY monetary value. In the next phase of the project, OSVB will generate social values based on coefficients from large representative data of Denmark or Nordic countries and discrete choice experiments. The Danish social values are meant to be applied in the Danish context as well as all Nordic countries, as these countries share similar cultural characteristics and welfare system models. OSVB will offer both (i) WELLBY coefficients (based on single-item life satisfaction) without monetisation, which is useful as a common metric for comparing effects across different interventions and CEAs, as well as (ii) the monetised social values, which are useful for carrying out social CBAs. Regarding the implementation of social values in government policy, the OSVB is initially led by the analytic community, but will likely eventually be handed over to the Danish government after a period of evaluation of the OSVB method and its reliability and feasibility within the Danish setting.⁸

In Canada, similar efforts to initiate the development of a ‘Database of Happiness Coefficients’ (DoHC) social value bank have begun recently (Barrington-Leigh and Lerner, 2023). The project advocates for an evidence-informed metric for wellbeing in Canada, with collaboration between academia, civil society, relevant stakeholders, and government agencies playing a crucial role in constructing and curating this social value bank. A public body named the ‘Wellbeing Knowledge Centre’ (WKC) has been tasked with curating the value bank. A database of summary estimates has been assembled by carrying out a systematic review of 189 academic articles and working papers related to life satisfaction in Canada. The Canadian approach involves a number of principles for the implementation process of social values in government policy-making: (i) the social value bank is curated independently and at arms-length from government; (ii) maximum transparency for the value bank is sought, with the collating, reviewing, and synthesising evidence for the social values being subject to a collaborative undertaking, with engagement from all interested stakeholders; (iii) an ongoing openness to revision of the value bank by the WKC; (iv) the value bank is designed to inform calculations about expected distributions of wellbeing; (v) the value bank must target content to support the need of planners and decision-makers; and (vi) the value bank must be constructed in such a way that it allows hierarchically sourced evidence and to give appropriate priority to locally contextualised evidence.⁹

In the US, a social value bank has been created by Ohio University in conjunction with guidance from UK social value consultants from Social Value International and Simetrica-Jacobs. Ohio University’s *US Social Value Bank* is intended to be a US-equivalent to the HACT UK Social Value Bank (Fujiwara, 2013, 2014; Fujiwara et al., 2017), with a focus on practitioner use for

social return-on-investment analyses. The values are derived using the WELLBY approach recommended by the HM Treasury (i.e. pivoting off the value of a QALY, in line with the lower-bound derivation of the monetary value of 1.0 WELLBYs described above) (HM Treasury, 2021)—again, the method originally proposed by Frijters and Krekel (2021). Unlike the UK, no standard guidance exists for the WELLBY approach in the US, and each federal department (e.g. Department of Transportation, Center for Disease Control) uses a separate calculation for figures such as QALYs and VSL. In the absence of an agreed-upon figure in the US, researchers used the QALY value published in a recent study from the US Center for Disease Control (CDC) as the basis for the WELLBY figure in Ohio University’s *US Social Value Bank* (Miller et al., 2022).¹⁰ Coefficients have been derived from primary data. Estimates are based on data from the Midlife in the United States (MIDUS) Refresher 1, a nationally representative sample of adults aged 25–74 which provided the necessary single-item life satisfaction variable underlying the WELLBY and the most robust dataset of outcomes related to wellbeing in the US. After a review of the US literature, the analysis adjusted for relevant life satisfaction determinants.

Unlike other social value banks, Ohio University’s *US Social Value Bank* reports results in multiple ways. It reports effects in the same way others do, i.e. as cardinal effects of policy variables, but also reports the results in ways that retain the original scaling (cf. Frijters and Ferrer-i-Carbonell, 2004). Ohio University’s *US Social Value Bank* will be made publicly available to practitioners alongside training on subjective wellbeing valuation and its use in measuring social value.¹¹

Beyond GDP: the WELLBY as a measure of social progress

Metrics like GDP are inherently incapable of capturing the breadth of life experiences as they were designed to capture only monetised goods and services, leaving out everything unpaid, which happens to be most things of value. After all, we do not normally buy or sell children, compassion, or the kindness of our friends. The WELLBY can be a more comprehensive and inclusive measure of social progress, capturing the full breadth of life experiences, and hence help us go beyond GDP. In what follows, we operationalise WELLBYs as an alternative to GDP.

The quality of life in country j in year t can be measured as *expected lifetime WELLBYs* (i.e. expected wellbeing-years at birth, defined as the wellbeing-years that would be experienced, on average, if current age-specific mortality rates and average life-satisfaction scores were to apply for the rest of the population’s life):¹²

$$W_{jt} = (\overline{LS}_{jt} - LS_0) Y_{jt} \quad (3)$$

where \overline{LS}_{jt} is the average life satisfaction on a 0-to-10 Likert scale for a given country j in year t ; Y_{jt} is the average life expectancy at birth; LS_0 is the ‘zero point’ of life satisfaction, i.e. the level at which individuals are indifferent between living more years of life at that level or not living more years of life at all. The current level for LS_0 recommended in Frijters and Krekel (2021) is 2, which is applied for the 2011–2021 decade. Our data on life satisfaction come from the Gallup World Poll (cf. Economics @ Intelligence, 2023), our data on life expectancy from the World Bank. One way to interpret this metric is the total expected life-satisfaction points that a newborn will receive in her expected lifetime if the circumstances in that year remain constant.

Note that we side-step a few thorny issues. First, countries differ in terms of their age distribution and as there is a bit of an age-effect in life satisfaction (cf. Blanchflower, 2020), this creates differences between the average life satisfaction of countries even

Table 3 Expected lifetime WELLBYs in selected countries and years.

Country <i>j</i>	Year <i>t</i>	Expected lifetime WELLBYs (W_{jt})
Australia	2016	432.86
Colombia	2012	330.73
Germany	2015	406.20
Japan	2021	345.49
Nigeria	2013	145.70
Philippines	2017	257.05
Saudi Arabia	2020	347.62
South Africa	2018	189.40
Spain	2014	370.91
United Kingdom	2011	394.17
United States	2019	389.50

Expected lifetime WELLBYs (W_{jt}) are calculated using Eq. (3). Source: Gallup World Poll, World Bank; own calculations.

Table 4 Percentage growth rates of World GDP (in PPP), expected lifetime WELLBYs (weighted by population level in each country), life satisfaction, life expectancy, and population level.

Year	GDP	WELLBYs	Life satisfaction	Life expectancy	Population level
2012	3.7	-0.6	-0.8	1.3	1.1
2013	4.2	2.0	1.3	1.4	1.1
2014	3.3	2.2	2.2	1.4	1.1
2015	2.1	-4.0	-4.1	1.1	1.1
2016	3.6	2.5	2.5	1.3	1.1
2017	4.8	2.8	2.7	1.2	1.0
2018	4.9	1.5	1.3	1.2	1.0
2019	4.4	1.2	0.7	1.3	1.0
2020	-2.7	-4.2	-2.8	-0.6	1.0
2021	8.6	0.3	1.3	-0.1	0.8

Both China and India were removed from both GDP and WELLBY calculations as we observed relevant distortions of including them (in particular, there were large migration movements due to lockdowns that changed the composition of the areas from which the samples were drawn as well as the composition of respondents with phones). Source: Gallup World Poll, World Bank, own calculations.

if it were the case that age-adjusted life satisfaction was identical. Second, and similarly, death is selective as death comes more quickly for the unhealthy and the poor, both of whom are somewhat less satisfied with life, meaning that longer-lived populations again have an artificial change in their average life satisfaction. Finally, taking an average as a measure means not commenting on whether it is desirable to have a large population or not. One can adjust for all these matters (and more), but we here chose to start with a metric that is simple to explain and easy to interpret, leaving more sophisticated analyses to future papers.

Table 3 shows expected lifetime WELLBYs from Eq. (3) in selected countries and years which are representative of their region in the 2011–2021 decade.

The countries with the highest expected lifetime WELLBYs during the 2011–2021 decade are Finland, Switzerland, and Denmark. Finland topped the list in 2020 with 482.52 expected lifetime WELLBYs. The countries with the lowest levels of expected lifetime WELLBYs are Lebanon, Afghanistan, and the Central African Republic. The minimum score in the 2011–2021 decade was only 13.42 WELLBYs in Lebanon in 2021, reflecting the civil strife and other dire problems the country then experienced, leading to average life satisfaction barely above 2 and hence barely above a life worth living. To wit on Japan, the low number is likely driven by the well-known low level of average life satisfaction in Japan, commonly ascribed to rigid social interactions and stringent behavioural norms. In the US, the number reflects a relatively lower life expectancy (below 78 now) but a much higher life satisfaction. Note that, due to potential context-dependency such as culture (cf. Uchida et al., 2004), trends within countries may sometimes be more informative than comparisons between countries.

The average level of expected lifetime WELLBYs in the world is 258.28 WELLBYs, roughly coinciding with Portugal in 2011. The world median is somewhat below the average, with 250.14 expected lifetime WELLBYs, roughly coinciding with Indonesia in 2014. Ecuador in 2021 lies in between the world average and median.

Importantly, the 2011–2021 decade saw a stagnation in expected lifetime WELLBYs in most developed Western countries (which may be partly ascribed to slower mortality improvements due to austerity measures, cf. McCartney et al., 2022), and even decreasing after 2018–2019. North America was declining quite fast during this period; Asia and Oceania were decreasing but at a slower pace, with Europe on the whole at the same level in 2021 as it was in 2011, though with a peak in 2018, similar to many OECD countries.

We offer average national expected lifetime WELLBYs as our alternative measure of social progress (or growth), which is itself driven by many economic, social, psychological, environmental, and other circumstances that affect both quality of life and length of life.

If we weigh these expected lifetime WELLBYs by the annual population levels in each country, we can derive *changes* in the per-capita levels of expected lifetime WELLBYs. These are shown in Table 4 and then compared to changes in the per-capita levels of GDP, both being aggregated to the world level. Moreover, we relate changes in the per-capita levels of expected lifetime WELLBYs to changes in average life satisfaction as well as changes in average life expectancy (both in percentage growth rates in the region for that period) to look at underlying drivers.

One can see that, while there certainly is a positive correlation, there is also a lot of independent change, such as in 2021 which saw high GDP per-capita growth but only moderate expected lifetime WELLBYs per-capita growth. Both concepts are clearly not the same and measure different, independent contributions to social progress. In fact, economic activity, as measured by GDP per-capita growth, may increase strongly while, at the same time, expected lifetime WELLBYs per-capita growth may be stagnant, such as in 2021 when the economy was bouncing back. A narrow focus on GDP may, therefore, paint a too-narrow picture of how our lives are doing.

Discussion and conclusion

In this paper, we introduced the WELLBY, a new measure of social value and progress, defined as one point of self-reported life satisfaction measured on a 0-to-10 Likert scale for one individual for one year. We showed how the WELLBY fits into conventional frameworks of policy analysis by entering ex-ante policy appraisals either as crude WELLBYs in CEA (when all benefits can be expressed in WELLBYs) or in CBA, monetised alongside other monetary benefits. Life satisfaction is also used and suitable as an outcome measure in ex-post policy evaluations. This enriches the evidence base of policies and programmes held by governments and other stakeholders, evidence collected in places like social value banks that carry WELLBY coefficients for future policy appraisals. There are now several initiatives around the world—including in the UK, Denmark, Canada, and the US—where social value banks of WELLBY coefficients are being developed, testifying to an increasing demand for wellbeing policy analysis.

As a novel contribution, we showed how changes in expected lifetime WELLBYs can be used to measure social progress overall, going beyond GDP and decomposing that progress into improvements in life satisfaction and life expectancy.

The WELLBY is a simple measurement tool that is useful for both small and large organisations to appraise and evaluate policies in terms of the wellbeing of citizens, employees, and customers. What the analyst mainly needs is sufficient observations to have a fairly narrow estimate of the life-satisfaction (and, if applicable, life-expectancy) effect of particular policy changes, a requirement that does naturally mean that one cannot really analyse small interventions on small groups of people. Either the intervention has to be large or the group of people has to be large in order to get narrow estimates of effects. Similarly, the WELLBY is not particularly suitable to value small, short-run, and one-off interventions, such as visiting a museum or being stuck in traffic, which may just happen once in a while. Here, alternative methods such as using people's hedonic experiences in real-time—so-called *experiential valuation* (Krekel and MacKerron, 2023)—can be used as a complement to WELLBYs in policy appraisals.

The WELLBY is a natural linking pin for issues of sustainability, a sense of purpose in life, and of individual and national resilience. Just consider: something that is not sustainable does not engender a large flow of wellbeing into the future because either the population at hand perishes or experiences a decrease in their quality of life. Similarly, a sense of purpose in life is known to have large and direct effects on life satisfaction and thus is a key determinant of the value of policies and narratives. Resilience can be directly understood as the (low) effect of large shocks on the WELLBYs of a population, for instance, applied to the ability of residents to quickly overcome natural disasters (cf. Frijters et al., 2023).

The methodology also poses difficult questions, which lend themselves as avenues for future research. Like any consequentialist humanistic approach, it lacks a natural appreciation for inalienable human rights or the wellbeing of entities that cannot express themselves in human terms, such as the natural environment. Such things would have to 'prove themselves' in WELLBY calculations to be of value, meaning that in order to 'count', things like 'degrees of freedom of speech' or 'unseen natural beauty' would have to be assigned a WELLBY value. This reflects that the WELLBY reduces the complexity of both human and natural life to a single dimension, which comes with the benefits of simplicity and accountability, but also with the obligation to generate a number for what is usually seen as uncountable. Hence, social value banks have their work cut out for them.

There are various hurdles in incorporating WELLBYs into policy-making, especially in countries that do not yet collect wellbeing metrics in their official statistics. An important first step would therefore be to incorporate personal wellbeing metrics, such as the ONS-4 in the UK, into official statistics, with regular data collection (once per year or ideally more often) as well as official reporting thereon, in line with Joseph Stiglitz' dictum of 'what you measure affects what you do; if you don't measure the right thing, you don't do the right thing'. This may draw politicians' and the public's attention and discourse towards wellbeing, both as a general life goal and as a priority and objective for public policy. An important second step would then be widespread education and exposure to what wellbeing is (and what it is not).

In the UK in the early 2010s, the inclusion of personal wellbeing metrics in official ONS statistics was significantly facilitated (not without obstacles) by a top-down coalition of high-level politicians and civil servants, in particular former Prime Minister David Cameron and, especially, former Cabinet Secretary Lord

Gus O'Donnell (the head of the UK Civil Service), as well as avid academic proponents such as Lord Richard Layard and Paul Dolan (who championed the ONS-4). Many other countries are still far from that scenario. Moreover, it took another decade until wellbeing (in the form of WELLBYs) was finally incorporated into HM Treasury's Green Book, the official guideline for policy appraisal, to provide new information on human welfare that income-based measures such as willingness-to-pay cannot. This only occurred after Frijters and Krekel (2021) spent years with the UK Civil Service to learn what could be useful and what would work (and not), helped by the What Works Centre for Wellbeing and many others.

It may well take yet another decade until the WELLBY is in common use by government analysts, as well as fully understood by politicians and the public, many of whom have never heard of it today. All too often, wellbeing is also mixed up with 'wellness' and criticised for being 'too soft', or too paternalistic (e.g. 'the government is telling you how to be happy').

This highlights the importance of public education about wellbeing for any successful attempt to incorporate wellbeing—and WELLBYs—into government operations. To be sustainable, innovations such as the WELLBY must not only be technically robust but also entail a political and practical implementation plan that includes educating the public—in a non-technical language—about what the addition of yet another metric into the public discourse will achieve. Major hurdles, hence, remain.

Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request. This is because the Gallup World Poll is not open-access data.

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Notes

- 1 Of course, the simplicity of the WELLBYs does not circumvent ethical considerations of experimentation, nor does it solve issues of attribution and causality in undertaking evaluation.
- 2 A notable limitation of the state of the literature is that most evidence still comes from *Western, Educated, Industrialised, Rich, and Democratic (WEIRD)* countries. Expanding the evidence beyond WEIRD countries is an important and promising avenue for future research.
- 3 The authors used a smartphone app that asked UK residents at random times about their momentary happiness and activities as they went about their daily lives, and then subtracted the marginal rate of substitution between each activity and income from the response-share weighted average of the marginal rates of substitution of all the other activities (the counterfactual), to obtain the VOT for each activity.
- 4 This is because the real GDP per capita growth rate and the elasticity of the marginal utility of consumption—the two components of the financial discount rate that make up the "wealth effect"—do not apply to wellbeing. What is then left over is the pure time discount, which is assumed to be 0.5% in the UK, and specific to UK public policy a catastrophic risk premium of 1%, yielding 1.5% in total (cf. HM Treasury, 2021, 2022).
- 5 Note that, in our stylised examples, we describe policy choices as based on the expected additional wellbeing of the *current* population, somewhat bypassing in our examples the issue of effects on those yet to be born, and the question of whether it is good or bad whether more or less are born, which is beyond the scope of our paper. Yet, Eq. (1) describes a general maximand, meaning that, for instance, the issue of the unborn is implicit in the issue of just who is in the N persons summed over.
- 6 In particular, Frijters and Krekel (2021) use nationally representative panel data from "Understanding Society" in the UK, showing that respondents who self-assess to have very good health (the highest possible level) have, on average, a life-satisfaction score of 8. The 'zero point' of life satisfaction (at which individuals are indifferent between living more years at that level or not living at all) is taken by Peasgood et al. (2018),

who conducted a discrete choice experiment. HM Treasury (2021) uses a ‘zero point’ of 1 instead of 2 as it more accurately reflects observed behaviour (i.e. the share of individuals committing suicide, according to ONS figures).

7 Note that, in our CEA, we convert income onto WELLBYs using a coefficient for log income of 0.4, which has been obtained from a causal, quasi-experimental research design involving lottery winners in Sweden (Lindqvist et al., 2020).

8 The OSVB can be accessed at OSVB.org.

9 The DoHC can be accessed at [lifefatisfaction.ca/dohc](https://www.dohc.ca).

10 Notably, when compared to a common currency, the QALY figure in the US is around six times larger than the UK QALY figure, or three and a half times larger compared with median household incomes (2014).

11 Questions about Ohio University’s *US Social Value Bank* can be directed to Dr Allison L. Rickett, rickett@ohio.edu.

12 As we are not able to predict the far future for countries, we propose *expected lifetime WELLBYs* as a simple, calculable metric for comparison. The concept of life ‘expectancy’ has a similar idea behind it.

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Author contributions

Paul Frijters: Conceptualisation, methodology, writing—original draft, writing—review & editing. Christian Krekel: Conceptualisation, methodology, formal analysis, lead writing—original draft, lead writing—review & editing, visualisation, project administration. Raúl Sanchis: Conceptualisation, methodology, writing—original draft, writing—review & editing. Ziggi Ivan Santini: Conceptualisation, methodology, writing—original draft, writing—review & editing.

Ethical approval

Ethical approval was not required as the study did not involve human participants.

Informed consent

Informed consent was not required as the study did not involve primary data collection.

Competing interests

Paul Frijters: The author declares that he has no relevant or material financial interests that relate to the research described in this paper. Christian Krekel: The author declares that he has no relevant or material financial interests that relate to the research described in this paper. Raúl Sanchis: The author declares that he has no relevant or material financial interests that relate to the research described in this paper. Raúl Sanchis was partially funded by the Spanish Ministry of Science and Innovation project grant number PID2021-122209OB-C31 and partially funded by UPM projects P2005400072, P2110400020, and P2210400020, as well as by the Fundación MAPFRE. Ziggi Ivan Santini: The author declares that he has no relevant or material financial interests that relate to the research described in this paper. He was funded by the foundations Tryg-fonden and Ramboll Fonden.

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