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Beyond Development and Wellbeing: Experimenting with the Low Substitution Approach for Social Progress

Abstract

Social progress indices are key for assessing wellbeing and sustainable development of countries and societies. A pivotal neglected question is the appropriate level of substitution between 'subjective' - attitudes of individuals - and 'objective' - external standards- dimensions of social progress. Each dimension has its own rationale, history, and indicators. Our starting point is that the two perspectives have a special significance – jointly. Surprisingly, we do not find in the literature an approach that robustly represents this acknowledgment. Our approach addresses this lacuna, and advocates measuring social progress as a composition of the two components with a very low degree of substitution. Employing the constant elasticity of substitution function (CES), we empirically demonstrate the ramifications of this approach across assessments and rankings of countries. We show that the low substitution measurement matters the most for the middle- ranked countries. Representing social progress using two distinct subjective and objective components, with a low substitution elasticity is a robust measurement, that reflects an appealing conception of social progress.

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Beyond Development and Wellbeing:

Experimenting with the Low Substitution Approach for Social Progress

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Surprisingly, we do not find in the literature an approach that robustly represents this acknowledgment. Our approach addresses this lacuna, and advocates measuring social progress as a composition of the two components with a very low degree of substitution.

Employing the constant elasticity of substitution function (CES), we empirically demonstrate the ramifications of this approach across assessments and rankings of countries. We show that the low substitution measurement matters the most for the middle- ranked countries.

Representing social progress using two distinct subjective and objective components, with a low substitution elasticity is a robust measurement, that reflects an appealing conception of social progress.

1. Introduction

Social and political scientists have pondered different conceptions and indicators of 'social progress' for decades.[1] This has occurred in the context of assessing comparative social progress. In particular, two categories of conceptions have evolved: 'subjective' and 'objective'; each category with its own theoretical justifications and conventional indicators: 'subjective' conceptions posit the aggregate subjective attitudes of individuals in a society as the core of social progress; 'objective' conceptions posit core non-attitudinal external standards (Michalos 2017, Gasper 2004, 2010, Berger-Schmitt & Noll, 2000).

Conventionally, although not necessarily, subjective conceptions ('subjective welfarism') build on subjective indicators, such as Life Satisfaction surveys, and objective conceptions ('needs,' 'capabilities', etc.) build on objective indicators, such as average income, longevity, years of schooling, etc.

This paper experiments with the idea that social progress is, alternatively, the degree to which a society fulfills the two conceptions *together* (as implied in Cohen Kaminitz 2020). With this idea in mind, in order to represent social progress, we need, firstly, to disentangle the two aspects of social progress as two separate components, and secondly, to express the two components in a functional form in which only a low degree of substitution between the two components is allowed. We call this a 'low substitution approach.'

[1] Scholarly and scientific works use different terms related to 'social progress', such as: 'development', quality of life', and others. For convenience, we use 'social progress' as an intentionally unspecified label in need of conceptual explication (this term is also used in the influential report of Stiglitz et al. 2009).

This approach is different from those usually underpinning existing indices, in which the common (implicit) assumption either favors one conception or assumes a substantial degree of substitution. For example, the well-established UN index, the Human Development Index (HDI), lacks a subjective component, the World Happiness Ranking (WHR) rests solely on a subjective component, and the OECD index, the Better Life Index (BLI), combines objective and subjective components with a substantial degree of substitution.

Proposing a low substitution between the two components (subjective and objective) is not a technical issue. It is a significant interpretation of how we ought to understand social progress in the 21st century. It is the normative stance according to which, from a broad political point of view, both aspects of social progress – perceived welfare and particular external objective standards – are necessary and only jointly sufficient for indicating social progress. The paper explains this interpretation and exemplifies its measurement implications.

This research addresses the central hypothesis that the level of substitution also matters empirically. We hypothesize that different degrees of substitution between subjective and objective conventional components result in different rankings of social progress. In particular, a very low degree of substitution results in significantly different rankings for a substantial number of countries. If confirmed, this hypothesis contributes to a process of 'discriminant validation' (Adcock and Collier 2001, 540), i.e., it strengthens the claim that the low substitution measurements measure a distinct concept.

The operationalization of the research is conducted by utilizing the constant elasticity of substitution function (CES), common in economics and a useful tool for comparing outcomes under different degrees of substitution. This allows us to compare social progress rankings of countries-years under the low substitution approach relative to other rankings and change the substitution level as we choose.

1. Presenting the low-substitution approach

In general, indicators represent *conceptions* (Cartwright and Runhardt 2014), and social progress indicators represent alternative conceptions of social progress (Fleurbaey and Blanchet 2013, Gasper 2004, 2010, Berger-Schmitt & Noll, 2000). Political scientists distinguish the conceptual level from the indicators level. Hence, while indicators are supposed to represent conceptions, a preliminary conceptual analysis is needed to clarify the exact role of indicators and the division of labor between them (Adcock and Collier 2001, Goertz 2020).

The low substitution approach to social progress proposes that the socially progressed society is a society that *jointly* fulfills two conceptual requirements: The first, the **subjective** requirement, has a longstanding tradition behind it (the 'utilitarian' tradition) and has grown especially dominant in underpinning empirical works in the past decades. It stands for the view that what matters for social progress is the aggregate subjective attitudes of the people in a given society. Attitudes may consist of actual feelings, such as pleasure, happiness, etc., the satisfaction of desires and preferences, or judgments and beliefs that life is good/bad based on deeper reflections. Attitudes can be either emotive or cognitive, depending on the particular conception adopted. The second, **objective** (non-attitudinal/external) requirement draws on its own distinguished traditions that go beyond subjective attitudes: 'basic needs,' 'capabilities,' 'equality,' 'social resilience' and 'sustainability' exemplify conceptions in this category, conditioned by the question of whether they are taken to be significant to social progress *regardless* of their impact on subjective attitudes. The objective conceptions are regarded as either universal or local and may change between societies and times.

With the low substitution interpretation of social progress, each of the conceptions turns out to be one of the components in one conjoint 'basic-concept' (Goertz 2020), when:

- Each component ('subjective' and 'objective') is necessary for indicating social progress.
- They are only jointly sufficient to indicate social progress (therefore, one can compensate for the other only to a limited extent).
- These assertions are valid *regardless* of causal relations between them.

When representing these insights by measurement, the solution of one index with two well-constructed components, equally weighted and with a low elasticity of substitution between them, is appealing. It assumes non-redundancy of each of the two components and represents the assumptions above in the most robust manner.

Note how the low substitution approach presupposes that the two components (subjective and objective) need to be disentangled. Only then should they be combined. Therefore, it demands a preliminary phase of selecting the indicators for the two components.

The justification of adhering to a low substitution approach is enhanced, so we argue, in a political context in which each of the two conceptions has been recognized as independently essential for social progress. In contemporary political contexts, notably, we commonly assume just that. The recent rise of emphasis on subjective perceptions and emotions in political studies, in general, suggests that the focus on 'objective' goals (economic, political) falls short in explaining social and political situations. An example is the recent literature on *populism* (Di Tella & MacCulloch 2005, Spruyt et al. 2016, Nowakowski 2021). The degree of causality between objective and subjective elements, as shown in these studies, is but contingent. Regardless of how thoroughly 'explained', the subjective component is considered highly significant in its own right in representing some political phenomena. It conveys unique information regarding these political realities, overlooked when building solely on objective

conceptions. Social progress, according to a low substitution approach, should be considered such a concept.

At the same time, climate change and the COVID19, as prominent instances, clarify the existential urgency of including objective standards such as 'sustainability' and 'resilience' as essential elements in determining social progress (Laurent 2017). This holds true *regardless* of their impact on people's attitudes and perceptions. This stance is the other substantial part of a low substitution approach.

To the degree that an independent status is ascribed to the two conceptions representing social progress, the justification – to adhere to a lower degree of substitution between the two components – grows stronger.

The low substitution approach is distinguished from other approaches that acknowledge the importance of combining subjective and objective data. In particular, it is distinguished from:

a. **Searching for correlations:** Much of the empirical research is focused on correlations and discrepancies between the two sets of data, subjective and objective (De Neve & Sachs 2020, Inglehart et al. 2008, Cummins 2000, Inglehart et al. 2008, Easterlin 1974). Such inquiries often presuppose a subjective conception – an implicit assumption that what ultimately matters are subjective attitudes, while objective standards are but inputs/drivers to achieve these subjective ends (as in De Neve & Sachs 2020, Frijters et al. 2020, Costanza et al. 2008). Others presuppose objective conceptions (Delhey & Steckermeier 2016). Our approach, conversely, assumes a conception that combines both aspects, regardless of correlations and causal connections between them.
b. **High substitution solutions:** With part of the existing social progress indices, the two aspects are recognized, whereas a high compensability is tacitly assumed between them

(Munda & Nardo 2009, Decancq & Lugo 2013). The implicit assumption is that one aspect can compensate for a lack in the other, an assumption that our approach rejects.

c. **Dashboard solutions:** Acknowledging the necessity of both criteria, a different practical solution is to present the two sets of information separately on a 'dashboard.' This solution, although desirable in some contexts, fails to provide a unified scale, an efficient communication tool. Our low substitution approach overcomes this pitfall: it results in one unified index (an efficient comparative communicating tool), and at the same time, preserves the obligation not to allow one aspect to compensate for a lack in the other.

d. **Data-driven solutions:** These approaches assume that combining subjective and objective indicators could benefit from data-driven procedures, such as factor analysis, MIMIC multiple indicators and multiple causes, structural equation models (SEM), etc. (Krishnakumar & Nagar 2008). We stress, however, that such a dilemma should be resolved by normative reasoning and not by data-driven procedures (see Decancq & Lugo 2013, Goertz & Mahoney 2012, Cartwright & Runhardt 2014). This is not necessarily to reject the use of data-driven techniques to construct each of the 'objective' and 'subjective' components (as in Krishnakumar & Ballon 2008, Busseri et al. 2007, Busseri, 2018).

e. **Preference-based solutions:** These approaches advise eliciting individuals' preferences regarding social progress aspects, either by equivalent income or stated preferences and other technics (Decancq et al. 2015, Fleurbaey and Blanchet, 2013, chapter 4, Benjamin et al. 2014). Preference-based approaches are different from our low substitution approach because they refer to the subjective point of view not necessarily as an essential *component* but as the procedure through which weights are ascribed to components.

2. Experimenting with the low substitution approach

a. Selecting components

As highlighted in the previous sections, two broad independent conceptions should be distinguished, each with its indicators and measurements. In order to experiment with the low substitution approach, we need, thus, to select two indices as our two components. Choosing the components is not a trivial task and involves political-normative and scientific considerations. However, for the purpose of the current exercise, we select components based on ready-made well-established indices with high reputation, which represent either objective or subjective conceptions. Other indices could be favored in future implementations of a low substitution approach.

Various competing indicators have developed to account for subjective attitudes (Brulé & Maggino 2017), including Subjective Well-Being (SWB) indicators (Layard, 2010, Diener et al. 1985, Kahneman et al., 2004). One well-established example is used in the World Happiness Report (hereafter WHR), a life-ladder comparative indicator published by Gallup and based on a worldwide survey of people's satisfaction with their life as a whole (Helliwell et al. 2007, 2020). According to our distinction, this indicator conceals a subjective conception of social progress: it is supposed to represent social progress in the sense of subjective attitudes. Hence, it will serve here as an exemplary index of the subjective category.

Regarding the objective/external component, there is a variety of competing conceptions, with only part of them converted to conventional international indices. We choose here two alternatives for such conceptions and indices. One is the UNDP Human Development Index (hereafter HDI), inspired by Amartya Sen's influential idea of *functionings and capabilities*. Sen's conception famously posits 'functionings and capabilities' as the core of social progress,

instead of 'utility' or 'subjective welfarist. Functionings are 'the various doings and beings that people value and have reason to value'; capabilities are the real opportunities that they have to accomplish these functionings (Sen 1985, Alkire 2016).

The Human Development Index is composed of a geometric average of three normalized indicators: log (GDP) in purchasing power parity, life expectancy in years, and education (a weighted average of literacy and school enrollment rates). The three indicators together are held to represent the averaged capabilities of the individuals in a society (Anand & Sen 1994). In our terminology, the prestigious HDI is designed to represent an objective/external conception of social progress. It will serve here as an exemplary index representing this category.

Note how, although social scientists have explored correlations between this index and subjective indicators (Hall 2013, Kroll 2015), its ultimate source of justification is *independent* of these correlations. It is not intended to represent subjective attitudes in the first place, but external circumstances, and therefore its validity does not depend on such a correlation.

An alternative index that we are experimenting with is based on the 17 Sustainable Development Goals (SDG). Accepted by the international community as a part of the broader 2030 agenda, these are a comprehensive set of policy goals that aim to end world poverty and hunger, address climate change and environmental protection, and ensure universal access to healthcare, education, and equality. The SDG index, developed in 2015, is composed of 114 indicators that comprehensively represent these policy achievements (Sachs et al. 2019). In this case, likewise, scholars have already explored *correlations* with the subjective indicator (De Neve & Sachs 2020).

Each of the two indices represents different objective standards (different conceptions), hence, providing an alternative candidate component for our low substitution new index. Each of them results with accessible comparative scores of social- progress.

b. **Experimenting with Low Substitution scores and rankings**

In this sub-section, we address the empirical hypothesis that the low substitution approach matters – that it is not only a distinctive conceptual approach, but it results in significantly different social progress rankings.

When combining the two components, two dilemmas appear: (i) the weights for each component, representing the relative importance ascribed to each aspect; and (ii) the level of substitution between them, representing the extent to which one can compensate for a lack of the other (Greco et al. 2019). The focus here is on the later, less noticed dilemma.

To operationalize alternative relations between the two components and the low elasticity of substitution, we use, to the best of our knowledge for the first time in this context, the constant elasticity of substitution function (CES). This function is widely employed in economics to represent both utility and production functions, and surprisingly, it has not yet found its way into the social progress measurements.

The CES function in its general (discrete) form:

$$X = \left[\sum_{i=1}^{n} a_i^{\frac{1}{\sigma}} x_i^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

Where x_i are the variables aggerated, a_i is the weight of the variable i and is a parameter representing the elasticity of substitution between the variables. The appealing property of the function is that it allows for a degree of freedom in setting the weights on each component as

well as the degree of substitution. The parameters could differ according to the normative preferences.

To experiment with the significance of the low substitution approach for operationalization, we take, first, the World Happiness Ranking WHR and the Human Development Index HDI (2019) to represent the subjective and objective components, respectively. We use the data for 141 countries with non-missing observations from the two sources.

We compute a CES function that includes the standardized HDI index and a standardized WHR indicator.[2] The overall correlation between the two indices is 0.76. We hypothesize, first, that when representing social progress, it would be significant for measurement to use both indices and not only one of them; second, that different degrees of elasticities of substitution result in different scores. We take, therefore, two elasticities to represent high and low elasticity of substitution between the indices $\sigma=3$ and $\sigma=0.1$.

We begin by illustrating the difference between using both the objective and subjective measures using the CES function with equal weights compared with using a single index such as the HDI. Figure 1 plots the ranking according to the substitution approach against the HDI ranking. The deviations (the distance from the 45-degree line) are especially large in the middle-HDI group countries. However, they are also evident in the other group countries (the correlation between the subjective and objective original components drops from 0.76 for the overall sample to 0.20 for the countries ranked 40 to 100 in the HDI).

[2] A common problem of social progress indices is scaling. This is especially true if we combine variables with different distributions. Commonly used indices overweight variables with larger variances. Therefore, we suggest the inputs used in the CES function be standardized.

Figure 1

Substitution between HDI and WHR (CES function) compared to HDI index

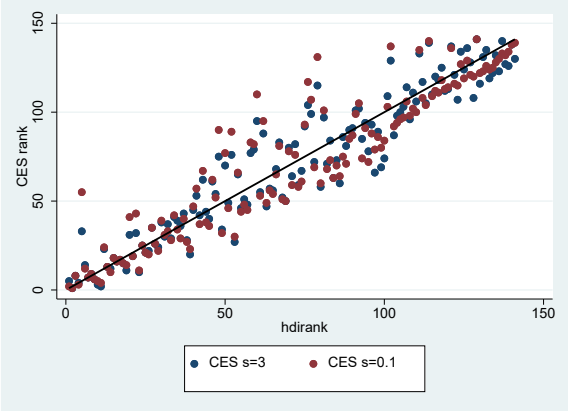
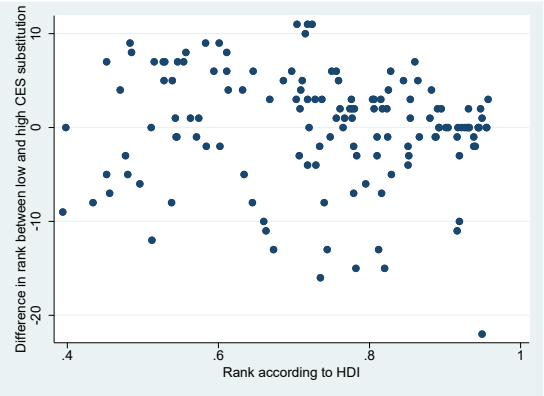


Figure 2 shows the differences between the high and low elasticities of substitution within the CES function. The differences are especially noticeable in the lower half of the HDI ranking distribution. Although the correlation, based on Kendall's Tau, between the low and high substitution CES function is high (0.93), the average deviation between them (in absolute value) is 4. For 20 countries, the difference in ranking is statistically significantly different from zero.[3]

Figure 2

Differences in country rankings according to CES function with high and low substitution by HDI ranking



[3] The countries are: Botswana, El Salvador, Georgia, Guatemala, Hong Kong S.A.R. of China, Indonesia, Japan, Kenya, Lebanon, Libya, Malawi, Myanmar, Nicaragua, Niger, Senegal, South Korea, Sri Lanka, Turkey, Turkmenistan, Vietnam

Table 1 lists the countries with the five largest positive and five largest negative differences between the HDI ranking and the CES functions and between the low and high elasticity CES functions. For example, Hong Kong drops from a rank of 5 in the HDI index to 55 using a CES function with an elasticity of 0.1. Conversely, Costa Rica moves up from a rank of 53 to 30. Hong Kong also drops from a rank of 33 in the high elasticity of substitution case to 55 using low elasticity. Turkey drops from a rank of 75 in the high elasticity of substitution case to 90 using low elasticity. We denoted with an asterisk the countries for which the difference between the high and low substitution CES is significantly different from zero.

Table 1

Countries with 5 largest positive and 5 largest negative deviations in rankings between HDI rank and CES with low substitution

Country	HDI rank	WHR rank	CES low substitution	CES high substitution
Botswana*	79	135	131	115
Sri Lanka*	60	126	110	95
Hong Kong*	5	68	55	33
Turkey*	48	108	90	75
Lebanon*	76	131	117	104
Costa Rica	53	18	30	27
Kyrgyzstan	95	66	72	78
Philippines	86	36	64	60
Uzbekistan	84	42	63	63
Jamaica	80	34	60	58

The empirical results show that the rankings of countries are affected by using subjective and objective components (relatively to adhering to only one component). Moreover, the data show that in terms of the CES social progress function, the differences are amplified if we assume a low elasticity of substitution.

As explained, different indices may be favored to represent the components. We, therefore, experiment here also with the SDG Index as an objective component. This index represents a more recent comprehensive conception of social progress that includes other policy goals than 'capabilities' (however, its aggregation method is less developed than the HDI).[4]

The differences between the HDI and SDG indices in scores are quite substantial: the overall rank correlation, using Kendall's Tau, between them (based on 141 countries with available data) is 0.7. This high correlation is mainly driven by the top and bottom countries in the distribution. The correlation drops to 0.16 for countries ranked 35 to 75 according to the HDI index.

Figure 3

Substitution (CES function) between SDG index and WHR compared to SDG index

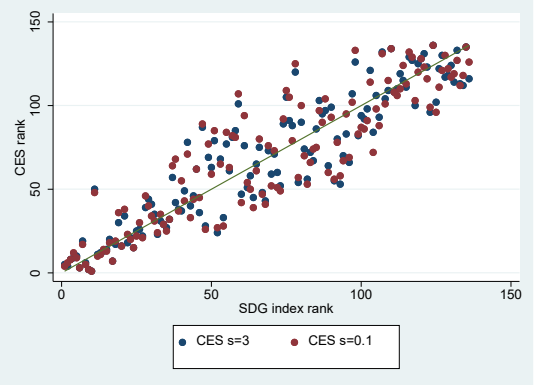
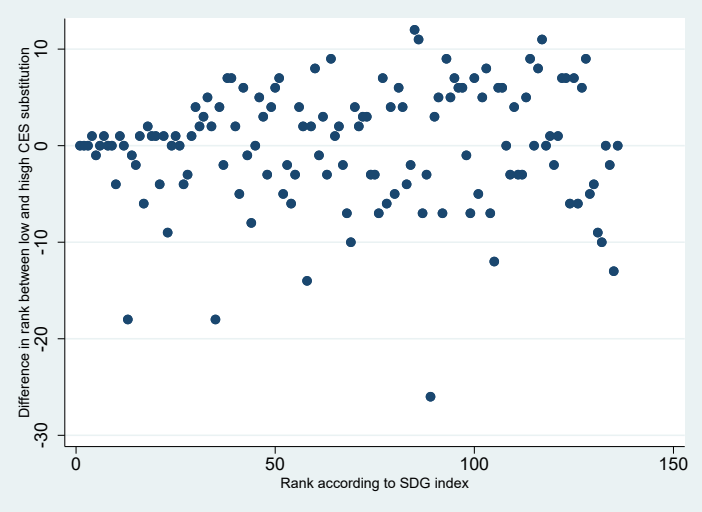


Figure 3 compares country rankings according to a CES function and SDG index. We can see that the main differences in ranking between the two measures are concentrated in the middle group of the countries. As De Neve and Sachs (2020) found, the overall correlation between the SDG Index and WHR ranking is high – 0.91. However, the correlation drops to 0.33 for countries ranked 25 to 75 in the WHR index.

[4] Four countries/territories that are ranked in the HDI index are not ranked in the SDG index: Comoros, Hong Kong S.A.R. of China, Libya, Palestinian Territories

Figure 4

Differences in country rankings according to CES function with high and low substitution by SDG index ranking



As in the case of the HDI index, although the correlation between the low and high substitution CES function is high (0.91), the average deviation between them (in absolute value) is 4. For 21 countries, the difference in ranking is statistically significantly different from zero.[5]

[5] The countries are: Bahrain, Bangladesh, Belarus, Benin, Bulgaria, Croatia, Dominican Republic, Ethiopia, Guatemala, Indonesia, Jordan, Kenya, Liberia, Malawi, Mauritania, Mongolia, Nepal, Niger, Peru, Tunisia, Ukraine.

Table 2

Countries with the 6 largest positive and 5 largest negative differences between the WHR and ranking according to CES with low substitution between WHR and SDG index

Country	SDG index rank	WHR rank	CES low substitution	CES high substitution
Guatemala	105	37	95	83
Bahrain	89	16	68	42
Liberia	135	86	130	117
Saudi Arabia	87	26	64	57
Philippines	92	36	74	67
Kuwait	99	46	84	77
Japan	17	61	36	31
South Korea	27	62	38	34
Hungary	24	55	32	32
Latvia	21	57	35	31
Chile	29	59	37	38

3. Discussion and conclusion

As exemplified, adhering to the low substitution approach makes a difference to the assessments of social progress of many countries (compared with subjective or objective approaches alone and compared with a high substitution approach). This holds in the two cases of HDI and SDGI despite relatively high overall correlations between subjective and objective indices for the whole sample of countries in the two cases. This is because in these cases, correlations are much weaker in the middle-group countries – for which the low substitution approach makes the most difference. These countries, we may add, are the interesting group of countries when assessing social progress: for most of the leading states, as for the extremely

failed states, there is not much question regarding their level of progress, and not much of a difference if we adhere to one conception and index of social progress or another.

Assuming that the two kinds of considerations (subjective and objective) are regarded as highly significant and uncompromised, the low substitution approach and the CES function allow us to represent social progress robustly. The method is neutral with respect to 'balanced cases' (for countries that do not change their rank) but becomes significant in many other cases. It allows us not to accept a separate representation of the two aspects or an arbitrary combination of them.

A low substitution approach reflects a comprehensive understanding of social progress. For instance, if we take Hong Kong, in 2019, the 'objective' HDI index ascribes the country with the high ranking: 5. However, the information this ranking conveys is partial and misleading: it neglects the subjective point of view – the way people are actually experiencing their life. Accepting a combination of the two components with high substitution is better but could still be questioned because we let one component compensate for a lack in the other. In this respect, the low substitution approach represents a comprehensive interpretation of social progress that ascribes uncompromised attention to both considerations together.

A low substitution approach, moreover, sharpens our conception of social progress. Even if we accept a unique (uncompromised) role for the subjective points of view, it forces us to revisit the central question: What exactly is significant for social progress regardless of subjective attitudes in the 21st century? This question is particularly timely and pressing during a pandemic, climate change, and rising inequality.

Appendix:

Materials and Methods

To compute the CES function example, we use in this paper, we need one objective and one subjective index. We chose two indices: the widely used Human Development Index (HDI) computed by the United Nations Development Program (UNDP). We used the 2020 edition that provides aggregate rankings for 2019. We also used the 2021 SDG index reported in Sachs, J., Kroll, C., Lafortune, G., Fuller, G., Woelm, F. (2021). The Decade of Action for the Sustainable Development Goals: Sustainable Development Report 2021. Cambridge: Cambridge University Press.

We used data from the 2021 edition of the World Happiness Report 2021 (WHR). The report uses data from the Gallup World Poll surveys from 2018 to 2020. The life ladder is based on rankings by individuals with the best possible life for them being a 10, the worst a 0. They are asked to rate their own current lives on this 0-to-10 scale. We used the data for 2019 from this edition.

Data for the SDG index was taken from the Online database for the Sustainable Development Report 2021.

Since the HDI, SDG index, and WHR have different scales; we standardized them.

In computing the ranks of countries, we used the level of GDP provided in the WHR as a tiebreaker.

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